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EVALUATION OF INTERFACE BETWEEN VEHICLE FUEL FILLPIPES AND VAPOR RECOVERY NOZZLES

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Field tests were made of the fit of three prototype vapor recovery nozzles on 860 in-use vehicles. This effort was in support of EPA activities relating to the recovery of gasoline vapor presently lost to the atmosphere during the vehicle fueling process. The nozzle fit observations were assigned numerical ratings in accordance with a fit code logic sequence, and these results analyzed by a procedure which quantified the nozzle fit characteristics of the in-use vehicle population for the past 15 years. This permitted the determination of the percentage of the in-use vehicle population that is amenable to vapor recovery programs of varying degrees of constraint. Those vehicles that present problems in effecting vapor recovery were specified as to the type and number of vehicles involved, and the nature of the problem in each case.

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FOREWORD

This report, prepared by The Aerospace Corporation for the Environmental Protection Agency, Division of Emission Control Technology, presents the results of a study concerning the recovery of gasoline vapor presently lost to the atmosphere during the vehicle fueling process. The study consisted of a field test program in which the fit of prototype vapor recovery nozzles was tested on in-use vehicles and an analysis of the structure of the in-use vehicle population. These results were combined to determine the percentage of in-use vehicles that are amenable to vapor recovery and to quantify the problem vehicles.

Sections 1 and 2 of this report provide a program overview. Sections 3, 4, and 5 describe the procedures used in field test and data characterization phases. The key results are given in tabular form in Section 6 and are discussed in Section 7. Detailed results, of interest to the specialist, are given in the Appendixes.

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1. INTRODUCTION

A number of the transportation control plans promulgated by EPA require the installation of control devices at gasoline service stations that prevent the emission of 90 percent of the hydrocarbons presently lost during vehicle fueling. This requirement pertains to the current in-use vehicle population. However, a mechanism is provided for exempting certain classes of vehicles where it is impractical to comply due to vehicle fillneck configuration, location, or other design features.

Two major problems exist with the regulations as currently worded. First, it is not clear how a given system is to be approved or certified as being 90 percent effective. Depending upon the test procedures used and vehicles selected for testing, one can measure a wide range of control efficiencies for a given system. Secondly, it is not clear what vehicles, if any, may be exempted from the requirements. If enough vehicles were excluded, nearly any system could be certified.

EPA has recently proposed detailed test procedures for measuring the effectiveness of vapor recovery systems. The proposed procedures clarify what is meant by 90 percent effectiveness and establish how a service station owner can certify that his control system meets the requirements of the regulations. Reduced control levels have been proposed for smaller stations, with the smallest stations being exempted from control. The proposed test procedures involve the fueling of a representative sample of vehicles at an operational service station equipped with the system to be certified. Specific ground rules governing the composition of the test fleet are yet to be established for assurance that the measured system recovery efficiency reflects that which would be expected during regular commercial operations. If any vehicles are to be exempted from the vapor recovery requirements, they will be identified as vehicles that may be excluded from the certification fleets.

In support of this activity, the principal objectives of this study were (1) to evaluate the compatibility of three prototype vapor recovery nozzles with the fillnecks of the in-use light duty vehicle population, in terms of apparent ability to achieve a tight seal as is required in displacement vapor recovery systems; and (2) to identify those vehicles with interface problems, including classification of the problem type and determination of the percent of the total vehicle population represented by the class of problem.

It must be emphasized that these were not comparison tests of the three nozzles, which are designated herein simply as nozzles A, B, and C. Rather, they were selected to represent a cross section of current design of vapor recovery nozzles. The required information concerning nozzle access was obtained by nozzle insertion only, with no flow tests being conducted. The quality of the seal was determined by visual inspection and subjective judgment. Without flow testing, it is not appropriate to make detailed comparisons between the three nozzles.

The data of this report are, in many cases, tabulated in terms that include a separate listing for each of several domestic auto makers. This was done for information purposes only, and is not intended as a comparison of any effort made by these manufacturers since, at the time of manufacture of these vehicles, there were no vapor recovery standards upon which to design.

2. SUMMARY AND CONCLUSIONS

A field test program was conducted in which the fit of three prototype vapor recovery nozzles was tested on 860 vehicles. The tests were performed on vehicles found on the lots of new and used car dealers who agreed to cooperate with these tests. The field test data were then classified into groupings by manufacturer and fillpipe/vapor recovery nozzle characteristics. The number of in-use vehicles represented by each group was estimated by means of several data sources in the automotive literature. These data were then subjected to a computer sorting analysis that quantified the nozzle fit characteristics of the in-use vehicle population from the model years 1975 through 1960. The results define the percentage of in-use vehicles (and the specific make and model) that fall into various categories of nozzle seal and non-seal. This permits ready determination of the percentage of vehicles that can be effectively covered by a vapor recovery implementation program of varying degrees of constraint and identifies the problem vehicles and nature of the problem in each case.

Based on the results of this survey, an apparent tight seal can be achieved on 90 to 96 percent of the in-use vehicle population, if hand held situations are included. Unless a "no-seal, no-flow" device is incorporated in the nozzle design, it is not practical to assume that a service station attendant will regularly hold the nozzle in the sealed position. Considering only situations where the nozzle can be latched in a hands-off position, with an apparent tight seal being achieved, the coverage drops to 75 to 91 percent. Further restricting the data to cases where the nozzle can be latched and sealed in only the vertical position reduces the coverage to 60 to 8 percent of the vehicle population.

A significant potential problem area concerns low-angle fill pipes. Nearly 40 percent of the vehicle population is estimated to have a fillpipe angle of less than 30 degrees. This creates the possibilities of liquid spillage upon nozzle removal, and sloshing in the fillpipe, which may

cause premature shutoff and/or overflow of liquid into the vapor return line. This aspect will have to be evaluated in the field under flow conditions.

It is also of importance to investigate the magnitude of vapor losses to be expected from those pre-evaporative emission control cars that utilize a fuel system vent other than the fill cap. It is estimated that approximately 20 percent of the car population is in this category.

3. ESTABLISHMENT OF VEHICLE POPULATION DATA BASE

3.1 SALES BREAKDOWN BY MAKE AND MODEL YEAR

The purpose of this task was to prepare a tabulation of vehicle models and sales breakdown data for each manufacturer for each model year covering the period mid-1975 through 1960. The principal data sources used for this task were those periodicals and reference publications that summarize vehicle sales by make and model. The main publications used were:

a. Annual almanac and weekly editions of Automotive News
b. Wards Automotive Reports (yearbook and weekly reports)
c. Branham Automobile Reference Book
d. Auto market reports
e. Annual Engineering Specifications and Statistical Issues of Automotive Industries

A sample of one of these tabulations is given in Table 3-1. Included for each entry is the percentage of total sales for that category for that model year. The four categories of sales are domestic light duty vehicles (LDV), import LDV, domestic light duty trucks (LDT), and import LDT. Throughout this report, the vehicle categories of LDV and LDT are identical to the EPA definitions as given in the Federal Register, 40 CFR 86. Annual sales figures are not identical with model year production figures, but the former numbers are the only ones available in the extent and form required here. The difference between the two sets of figures will tend to disappear over a series of model years, however, and in any event will not make a detectable influence on the final results of this report.

The data sources listed above gave adequate sales breakdown of the LDV population, but were incomplete for LDT. This was inherent in these sources since it has long been common practice to classify the LDT sales for each manufacturer according to gross vehicle weight, or other

Table 3-1. Model Year Sales Figures, Domestic Passenger Car Summary, Chevrolet

Model / Model Year	Sales and Percent Sales per Model Year															
	1975		1974		1973		1972		1971		1970		1969		1968	
Model	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%
Monza	45,479	1.47	4,112	.06												
Vega	78,670	2.54	241,653	3.34	458,289	3.54	246,881	2.46	267,033	3.25	22,363	0.31				
Vega Wagon	33,967	1.09	84,654	1.17	113,364	1.14	60,446	0.73	56,410	0.69	157	0.002				
Nova	129,795	4.18	302,811	4.18	430,445	3.44	287,455	3.57	235,553	2.87	240,396	3.37	255,527	3.06		
Chevelle	106,171	1.42	240,618	4.01	312,420	3.47	248,028	3.57	335,378	4.09	346,714	4.86	389,103	4.65	370,170	4.41
Chevelle Wagon	20,615	0.66	42,787	0.60	62,463	0.55	45,972	0.55	44,776	0.55	34,340	0.48	42,796	0.51	42,189	0.50
Monte Carlo	114,426	3.69	276,450	3.80	247,130	3.11	192,319	2.31	145,787	1.78	121,246	1.70	21,601	0.26		
Bel Air	8,145	0.26	20,138	0.28	34,537	0.37	37,959	0.46	48,786	0.59	57,791	0.81	104,225	1.25	143,901	1.71
Impala	88,433	2.83	311,636	4.30	478,942	4.49	537,268	6.44	577,313	7.04	457,043	6.41	693,247	8.29	695,499	8.29
Caprice	50,097	1.61	137,470	1.90	142,473	2.02	172,521	2.07	139,272	1.70	67,967	0.95	118,732	1.42	114,479	1.36
Chevrolet Wagon	31,142	1.00	82,787	1.14	153,046	.60	158,431	1.41	97,316	1.19	93,045	1.30	131,923	1.58	146,170	1.74
Camaro	66,676	2.15	130,448	1.80	105,592	1.11	85,184	0.54	120,803	1.47	142,261	1.99	172,459	2.06	209,822	2.50
Corvette	20,867	0.67	29,114	0.40	29,303	0.31	25,143	0.30	23,670	0.29	22,630	0.32	24,624	0.30	29,186	0.35
Biscayne					200	0.002	15,024	0.18	28,357	0.31	28,597	0.40	5,619	0.07	76,381	0.91
Caprice Wagon									40,777	0.50	27,561	0.39	41,362	0.49	31,960	0.38
Corvair													4,280	0.05	12,977	0.15
Nova and Chevelle															177,785	2.12
Total			1,413,456	24.44	2,410,211	25.02	2,134,257	25.60	2,155,431	26.31	1,662,111	23.30	2,005,745	23.94	2,050,514	24.43
Domestic total			7,240,342		9,631,156		8,337,302		8,204,500		7,132,426		8,361,714		8,393,112	

Table 3-1. Model Year Sales Figures, Domestic Passenger Car Summary, Chevrolet (Continued)

Model Year	1947		1948		1949		1950		1951		1952		1953		1954		1955	
	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%	Sales	%
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composite classes, rather than by specific product-line models. This factor placed restrictions on the analysis of the nozzle fit data taken on LDT, as is discussed later.

The information generated in this task was used to prepare field tally sheets for each manufacturing division of the domestic auto makers (covering both LDV and LDT) and for 26 import manufacturers. These field tally sheets gave a complete listing of all makes and model years produced by each manufacturer. They were used in the field tests to keep a running account of those makes and model years that were physically tested.

3.2 ATTRITION FACTORS

A set of attrition factors was generated, based on the smoothed results of a survey of annual almanac editions of Automotive News for the last 15 years. The attrition factors obtained are shown in Table 3-2. This set of figures was assumed, for the purposes of this report, to apply to all vehicle classes. Multiplication of the sales figures described above for a given model year by the corresponding attrition factor gives an estimate of the on-the-road population of that model year. These attrition-weighted numbers formed the data base framework with which the field nozzle test data were combined. In Table 3-3, these estimates are summarized for the on-the-road population for each of the four major catagories of domestic LDV and LDT and import LDV and LDT.

For each vehicle covered by the field tests, the number of vehicles assigned to that make and model year for the subsequent data analysis was the attrition-weighted sales figure for that year.

Table 3-2. Attrition Factors

Model Year	Age	Fraction in Operation
1975	0	1.00
1974	1	1.00
1973	2	0.994
1972	3	0.985
1971	4	0.970
1970	5	0.951
1969	6	0.919
1968	7	0.856
1967	8	0.754
1966	9	0.604
1965	10	0.431
1964	11	0.307
1963	12	0.224
1962	13	0.178
1961	14	0.144
1960	15	0.108

Table 3-3. Estimated In-Use Vehicle Population

Year	Domestic LDV		Domestic LDT		Import LDV		Import LDT		Year-Total and Grand-Total
	Population	% of Total	Population	% of Total	Population	% of Total	Population	% of Total	
1975	3,102,141	3.03	491,342	0.48	820,565	0.8	110,554	0.11	4,524,602
1974	7,240,762	7.06	1,586,841	1.55	1,369,148	1.34	170,913	0.17	10,367,664
1973	9,487,914	9.26	1,761,456	1.72	1,709,593	1.67	226,157	0.22	13,185,120
1972	8,212,242	8.01	1,417,884	1.38	1,407,049	1.37	140,951	0.14	11,178,126
1971	7,958,365	7.76	1,138,959	1.11	1,421,702	1.39	86,176	0.08	10,605,202
1970	6,782,937	6.62	951,497	0.93	1,170,643	1.14	61,579	0.06	8,966,656
1969	7,684,415	7.50	1,010,154	0.99	975,626	0.95	31,663	0.03	9,701,858
1968	7,184,503	7.01	918,607	0.90	843,816	0.82	20,743	0.02	8,967,669
1967	5,704,804	5.56	688,768	0.67	588,556	0.57			6,982,128
1966	5,043,620	4.92	575,383	0.56	397,506	0.39			6,016,509
1965	3,768,878	3.68	398,744	0.39	245,417	0.24			4,413,039
1964	2,327,372	2.27	245,563	0.24	148,628	0.14			2,721,563
1963	1,606,324	1.57	156,908	0.15	86,379	0.08			1,849,611
1962	1,174,747	1.15	104,693	0.10	60,370	0.06			1,339,810
1961	788,562	0.77	73,106	0.07	54,521	0.05			916,189
1960	656,409	0.64	51,688	0.05	53,868	0.05			751,965
Σ	78,723,995	76.81	11,571,593	11.29	11,353,387	11.06	848,736	0.83	102,497,711

4. FIELD TEST PROCEDURES

In this section, the system used to search for vehicles is described as well as the procedures and techniques used in the field for each test vehicle.

4.1 SEARCH FOR TEST VEHICLES

4.1.1 Site

Automobile sales lots were used as the sites for virtually all of the vehicle/nozzle tests performed. On each prospective lot, the reasons for these field tests were described and a brief demonstration given of the procedure to be followed. An explanatory letter was also given, and the owner's or manager's permission was solicited to perform the nozzle fit tests on the vehicles on their lot. In nearly every case, this permission was readily granted, and the lot managers were often very cooperative in many respects.

4.1.2 Search Pattern

The following search pattern was used for the field tests. First, new car lots representing all the manufacturing divisions of the major domestic auto makers were visited. After at least one lot had been covered for each division, the survey was concentrated on used car lots that specialized in late model used cars. Next, a tour was made of new car dealerships for imports, concentrating on the high volume manufacturers (i.e., Volkswagen, Toyota, and Datsun). After this, the survey was switched to lots that specialized in older model used cars.

4.2. PROCEDURE FOLLOWED ON CAR LOTS

A two-man team was used in the field tests. One person walked the line of cars on the lot, checking each against the field tally sheets to see if it had been tested. The other person followed with the hand cart containing the test nozzles, camera equipment, and paper work. Every

vehicle on every lot was examined. All those not yet covered by the survey were tested, provided that the necessary physical access and vehicle identification were possible.

Some of the measurements made in the field were either subjective or were in the nature of estimates, such as fillpipe angle, nozzle angle at latch, etc. In order to make these measurements and observations consistent throughout the survey, they were performed by the same person. The second person recorded the observations and took photographs of many of the test scenes. He also observed the other operator during the nozzle manipulations and measurements to guard against error or oversight.

4.3 PROCEDURE FOR EACH TEST VEHICLE

The observations for each vehicle were performed in the following order.

4.3.1 Model Year

Whenever possible, this was determined from the vehicle identification number (for domestic LDV) or manufacture date (for import LDV). This information was generally readily accessible for late- to moderately late-model used cars (back to about 1968 for domestics and to the early 1970's for imports). If this was not the case, the model year information posted by the dealer (windshield identification tape, key tag, etc.) was used. On some lots, however, the dealer used no identification on the vehicle exterior, and the vehicle doors were all kept locked. Accordingly, it was not always possible to unambiguously determine the model year, especially for the older models. On large or busy lots, it was not feasible to contact the lot manager in all such cases, and some vehicles could not be tested for this reason.

4.3.2 Fillpipe Location

This information was logged as shown in the sample data sheet of Figure 4-1. The field comments shown therein mean that the fillpipe opening was above the bumper and that the license plate that covered the access port

PO-2

700

VEHICLE INSPECTION RESULTS

Vehicle Make OLDS Model Year 1973

Model Name Omega

Body Type 2-Door, Hatch Date 6/20/75

Fill Cap Retainer

[X] 2" Std. SAE [ ] Pop Open Cap

[ ] 2 1/4" Std. SAE

[ ] 1 3/4" Std. SAE

other 1.32 x 1.60

Vent Cap

[ ] YES [X] NO

(P/V)

Angle Between Nozzle Centerline and Horizontal ____ degrees

Filler Angle at Entry 30 degrees

Description of Filler

[ ] Flush mounted

[ ] Right Side [ ] Left side [ ] Rear

[ ] Side Behind Door, Recessed

[X] Rear, Inside Bumper (Above)

[ ] Cover Door [X] License plate (B.H.) [ ] Exposed

[ ] Other

Nozzle Fit Code		Comments
A	2	20° G, H
B	1	30°
C	1	30°

X-5087

Figure 4-1. Sample Field Data Sheet

was bottom-hinged. These field notes were helpful in the subsequent data analysis tasks.

If the fillpipe was straight, the angle that it made with the horizontal was estimated. If the fillpipe was curved near the end, this fact was recorded, and the general nature of the pipe shape was indicated by a simple sketch made on the data sheet.

If the vehicle required unleaded gasoline, the positioning and depth into the fillpipe of the lead restrictor were recorded.

4.3.3 Fill Cap Size and Vent

The fill cap size was measured by a ruler. The dimensions measured were the inner and the lip diameters corresponding to the dimensions K and J of SAE Standard J829b, "Fuel Tank Filler Cap and Cap Retainer." This permitted assignment of a standard SAE size to the fillpipe, where applicable.

If the fill cap was marked as to type (i.e., vented or not vented) this was logged on the data sheet. If the cap was not marked, this vent information was filled in subsequently by referring to catalogs of fill cap manufacturers.

4.3.4 Nozzle Fit Tests

Each of the three vapor recovery nozzles was inserted into the fillpipe and a fit code assigned in accordance with the fit code logic diagram shown in Figure 4-2. The test of a good latch was the capability of the nozzle to retain its latch when the operator's hand was removed. The test of a good seal was visual (i.e., the seal surface was observed to see if it made contact with the fillpipe all around the periphery). In the case of limited access that prevented a full view of the sealing surface, the operator ran his fingertips around the end of the fillpipe to check for contact with the nozzle sealing surface. No hoses were attached to the test nozzles.

In each case of latch and seal, the angle that the last, straight portion of the nozzle pipe made with the horizontal in the latched position was estimated. This estimate was, of necessity, approximate since, in the latched

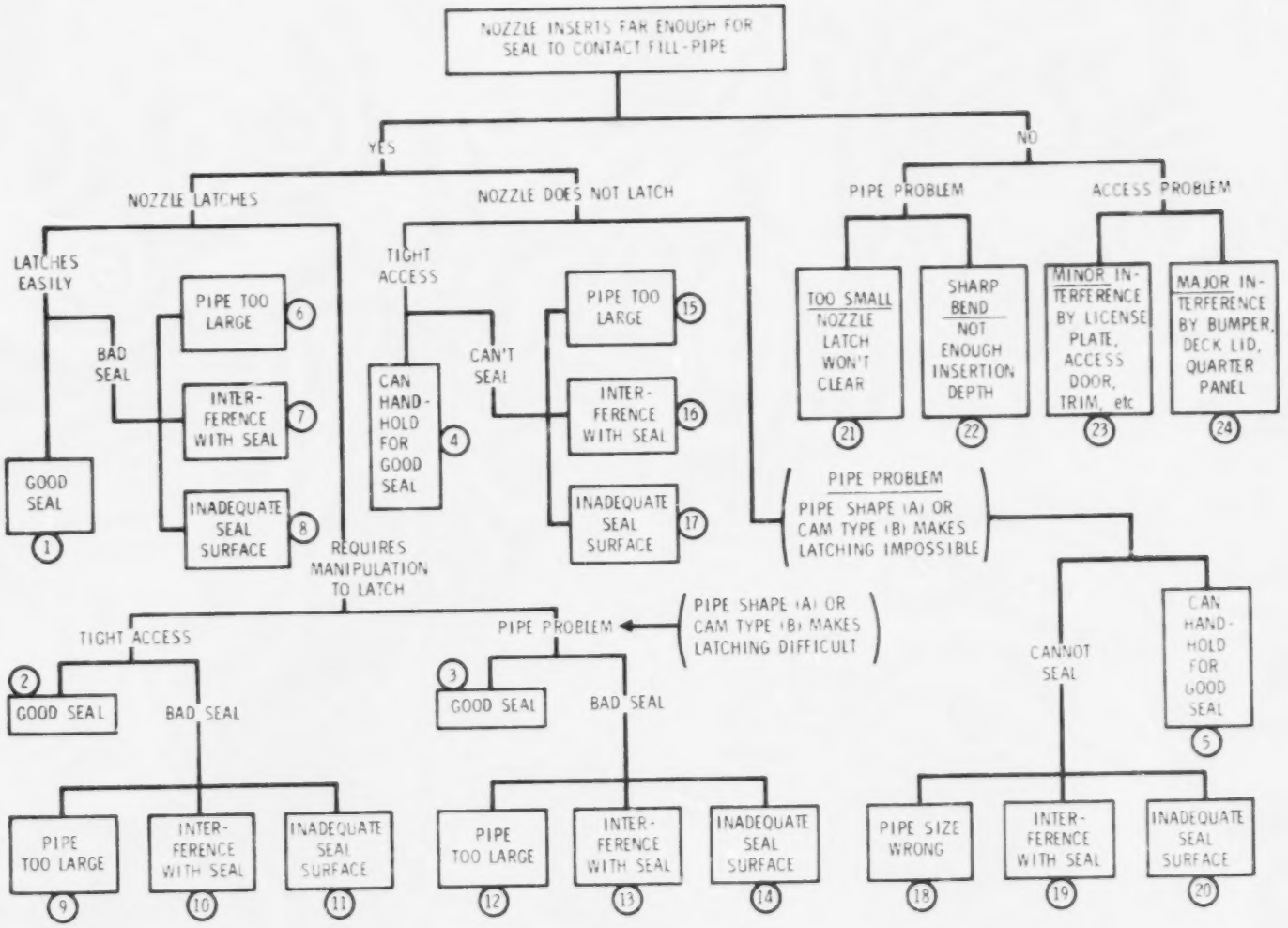
NOZZLE INSERTS FAR ENOUGH FOR SEAL TO CONTACT FILL-PIPE
YES
NO
NOZZLE LATCHES
NOZZLE DOES NOT LATCH
PIPE PROBLEM
ACCESS PROBLEM
LATCHES EASILY
BAD SEAL
PIPE TOO LARGE 6
INTER-FERENCE WITH SEAL 7
INADEQUATE SEAL SURFACE 8
GOOD SEAL 1
TIGHT ACCESS
CAN'T SEAL
CAN HAND-HOLD FOR GOOD SEAL 4
PIPE TOO LARGE 15
INTER-FERENCE WITH SEAL 16
INADEQUATE SEAL SURFACE 17
TOO SMALL NOZZLE LATCH WON'T CLEAR 21
SHARP BEND NOT ENOUGH INSERTION DEPTH 22
MINOR IN-TERFERENCE BY LICENSE PLATE, ACCESS DOOR, TRIM, etc 23
MAJOR IN-TERFERENCE BY BUMPER, DECK LID, QUARTER PANEL 24
PIPE PROBLEM
PIPE SHAPE (A) OR CAM TYPE (B) MAKES LATCHING IMPOSSIBLE
REQUIRES MANIPULATION TO LATCH
PIPE PROBLEM
PIPE SHAPE (A) OR CAM TYPE (B) MAKES LATCHING DIFFICULT
TIGHT ACCESS
2 GOOD SEAL
BAD SEAL
3 GOOD SEAL
BAD SEAL
CANNOT SEAL
CAN HAND-HOLD FOR GOOD SEAL 5
PIPE TOO LARGE 9
INTER-FERENCE WITH SEAL 10
INADEQUATE SEAL SURFACE 11
PIPE TOO LARGE 12
INTER-FERENCE WITH SEAL 13
INADEQUATE SEAL SURFACE 14
PIPE SIZE WRONG 18
INTER-FERENCE WITH SEAL 19
INADEQUATE SEAL SURFACE 20

Figure 4-2. Nozzle Fit Code Logic Diagram

position, the end of the nozzle is, of course, out of sight inside the fillpipe. The estimate was made by removing the nozzle, holding the nozzle handle in the same position relative to the horizontal as it occupied in the latched position, and then noting the angle of the end of the nozzle pipe.

A code was established to provide supplementary information to the fit code number. This information defined the nature and the cause of any difficulties encountered. For example, the comments G and H for nozzle A on the sample data sheet of Figure 4-1 indicate that the nozzle must be held sideways for latch and seal because of interference with the hinged license plate. If the vapor recovery nozzles had an access problem with a particular car, a conventional nozzle (OPW-7) was often inserted into the fillpipe to determine if the access problem was due entirely to the fillpipe environment rather than the increased bulk of the vapor recovery nozzles.

Many photographs were taken (an average of about one for every four cars) of particular nozzle fit and/or fillpipe situations for assistance in later evaluation procedures.

5. CATEGORIZATION OF FIELD TEST RESULTS

A total of 860 vehicles were physically tested for nozzle fit. These tests occurred on 48 car lots and were distributed among the four major categories as follows:

Category	Number of Test Vehicles
Domestic LDV	535
Import LDV	174
Domestic LDT plus others	129
Import LDT	22

The "plus others" in the domestic LDT category refers to some vehicles tested (vans and larger pickups) that actually come under the definition of heavy duty vehicles.

The procedures used to segregate these test vehicles and test data into various subcategories to facilitate analysis of the data contained in the field sheets are described in this section.

5.1 LDV VERSUS LDT

The sales (or production) breakdown information available for light-duty trucks was not sufficiently detailed to permit analysis of the LDT data in the same manner as that used for the LDV. The sales figures for LDT were broken down only coarsely into gross vehicle weight categories or into groups that contained several models. Usually, not all the models within a grouping were tested, and/or the fit codes of those models tested were substantially different. There were very few cases for LDT in which a given vehicle/nozzle fit relationship could be assigned to a specific number of in-use vehicles. This question was investigated in sufficient detail to establish that it would be quite time consuming (beyond the constraints of this program) to acquire additional information of the type needed. Also, there was no assurance that the results so obtained would be of sufficient detail to significantly

expand the data base. Accordingly, the analyses described in this report were restricted to light-duty vehicles, both domestic and import. These two categories account for 88 percent of the total in-use vehicle population (LDV + LDT) for model years 1975 through 1960.

5.2 FILLPIPE COMMONALITY

Upon completion of the field testing, an investigation was made to determine if the vehicle coverage could be expanded by fillpipe environment commonality. That is, do some models that were not tested have the same fillpipe environment (including access) as one that was field tested? To help answer this question, information on this subject was solicited from General Motors, Ford, and Chrysler. Those responses received were in different forms and varied widely in technical coverage. The most useful form was a listing of fillpipe part numbers (and sometimes bumper part numbers) for the various makes and model years. The supposition, in general, was that if a specific make (e.g., Plymouth Fury III), showed the same fillpipe part number for two or more successive model years, then these models probably had the same fillpipe environment. If only one of these model years was tested, perhaps the others could be claimed on the basis of commonality. This was only a starting point, however, and other factors (especially the field notes and photos taken during this survey) were taken into account.

A second class of commonality is possible, based solely on the data of the field sheets. For example, the field tests included a 1970 and a 1972 Buick LeSabre, but not a 1971. No commonality information was received from the manufacturer, but the field sheets showed the 1970 and 1972 models to be identical in all those aspects of fillpipe environment that were examined in the field, including the nozzle fit codes. It was therefore assumed that the 1970 and 1972 models were, in fact, identical in respect to fillpipe environment. It was considered very unlikely that a manufacturer would change to a different fillpipe configuration for only one model year and then go back to the previous configuration. The 1971 Buick LeSabre was therefore claimed on the basis of field sheet commonality for adjacent years.

Commonality by either of these two approaches was claimed sparingly, however. There are many practical features, such as the specific configuration of fillpipe access door trim, that can have a pronounced effect on the nozzle fit.

An illustration of this aspect is the 1971 Chevrolet Impala. Many model years of Impala were tested in this program, including the 1970 and 1972 but not the 1971. This model represents a very high sales figure, and inclusion of this one model year would increase the data base by 560,000 in-use vehicles. The manufacturer has indicated that the 1971 has the same fillpipe and bumper part numbers as the 1972 and, therefore, presumably has the same fillpipe environment. The 1971 model was not claimed, however, for the following reasons. First, this survey tested 10 different model years of Impalas and in no case did two successive model years have identical fillpipe environment (including nozzle fit codes) at least as far as could be determined from the field sheets. Second, it was generally a characteristic of General Motors cars that the fillpipe access was dependent on some specific features of access door trim that might not have correspondence with filipipe and bumper part numbers. Thus, it was concluded that there was not sufficient basis to claim the 1971 model year Impala.

5.3 VEHICLE COVERAGE

The vehicle coverage of this program was determined by tabulating the attrition weighted sales figures (as described in Section 3) for all those vehicle makes and models claimed by this suvey. This tabulation included those claimed on the basis of commonality, as defined in the preceding section. The computations were performed for each manufacturing division, and for all divisions combined, for General Motors, Ford, and Chrysler. They were also made for the categories of total domestic LDV, import LDV, and grand total LDV.

The results are shown graphically in Figures 5-1 through 5-9. The bar chart at the top of these figures shows the vehicle coverage for each individual year from 1975 to 1960. The total height of each bar represents

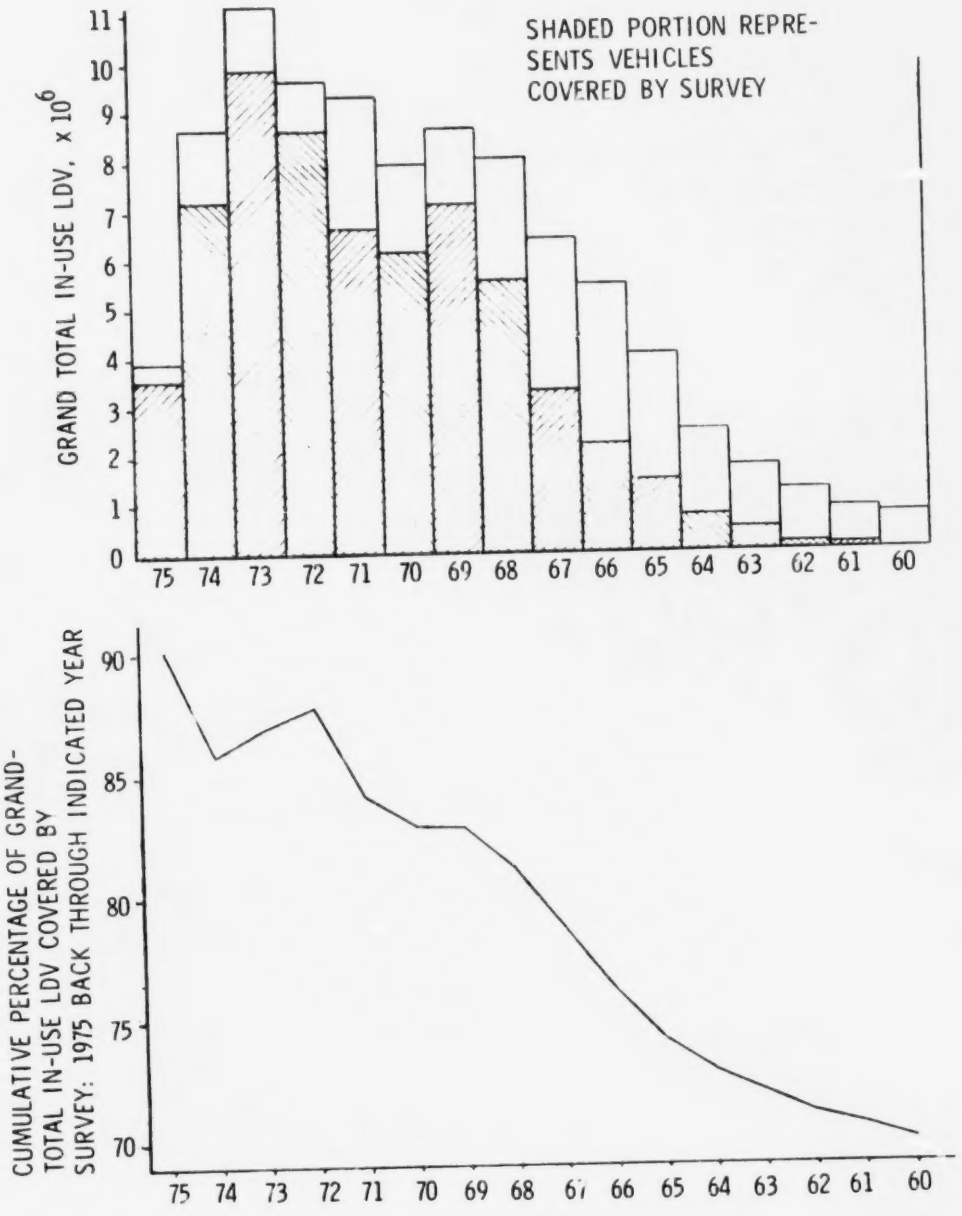

Figure 5-1. Vehicle Coverage for Grand Total LDV

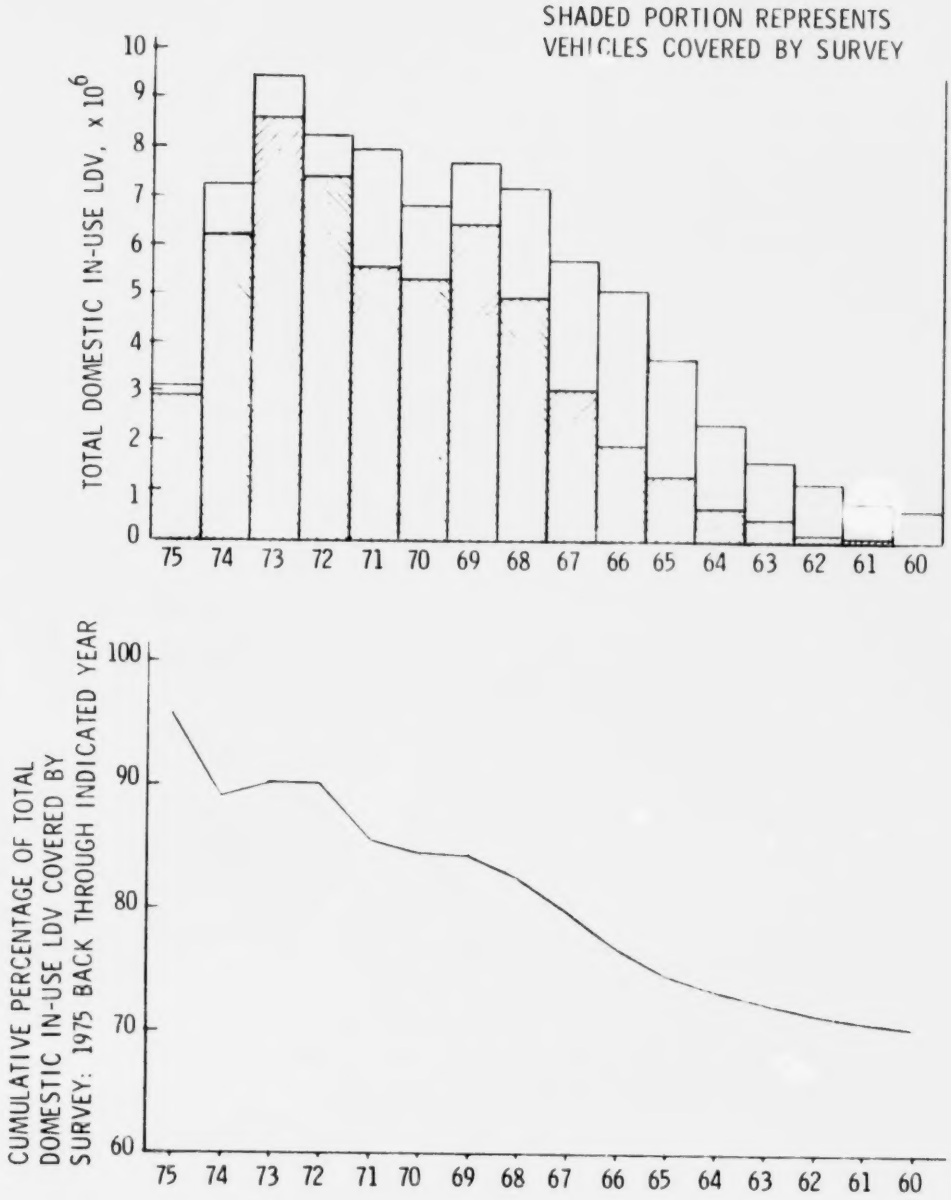

Figure 5-2. Vehicle Coverage for Domestic LDV

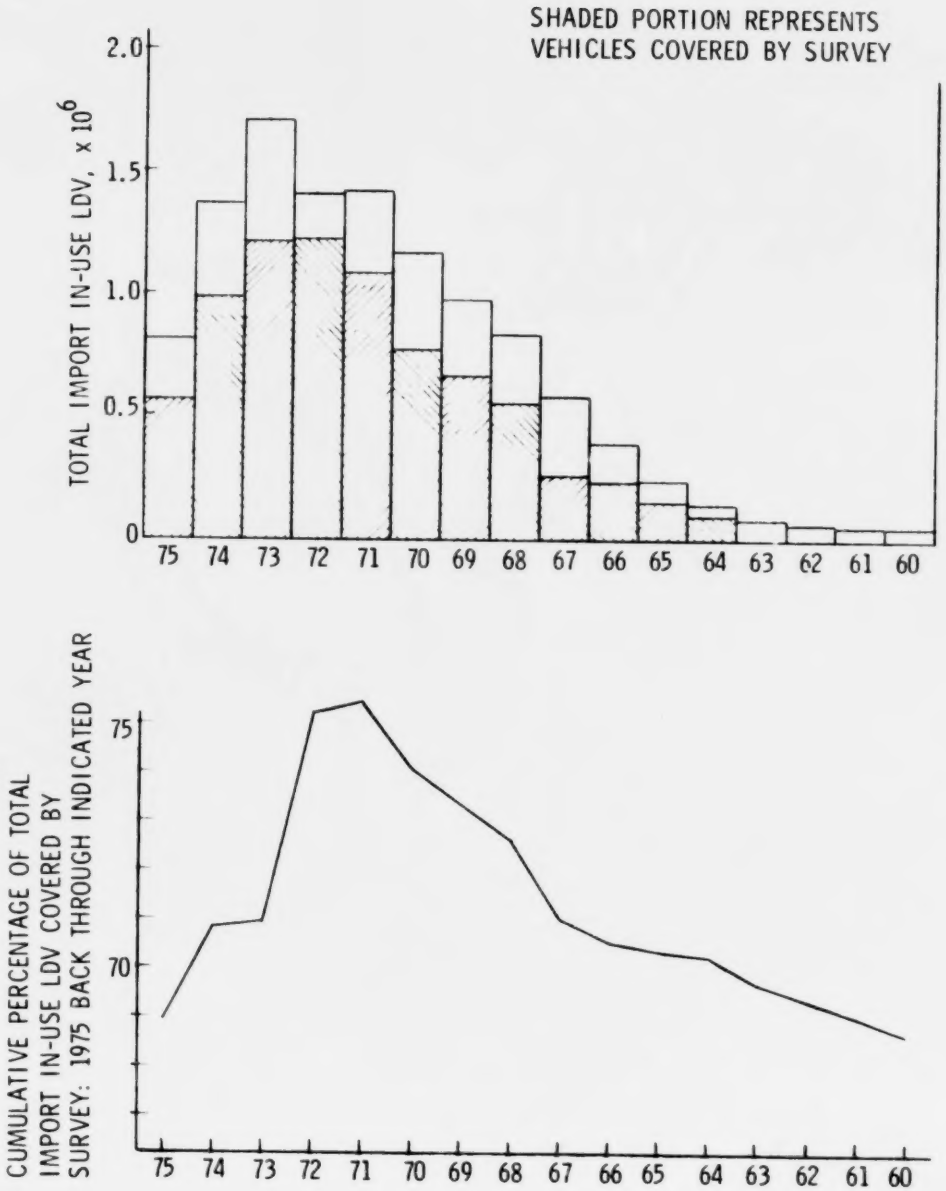
SHADED PORTION REPRESENTS
VEHICLES COVERED BY SURVEY
TOTAL IMPORT IN-USE LDV, x 10^6
2.0
1.5
1.0
0.5
0
75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60
CUMULATIVE PERCENTAGE OF TOTAL
IMPORT IN-USE LDV COVERED BY
SURVEY: 1975 BACK THROUGH INDICATED YEAR
75
70
75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60

Figure 5-3. Vehicle Coverage for Import LDV

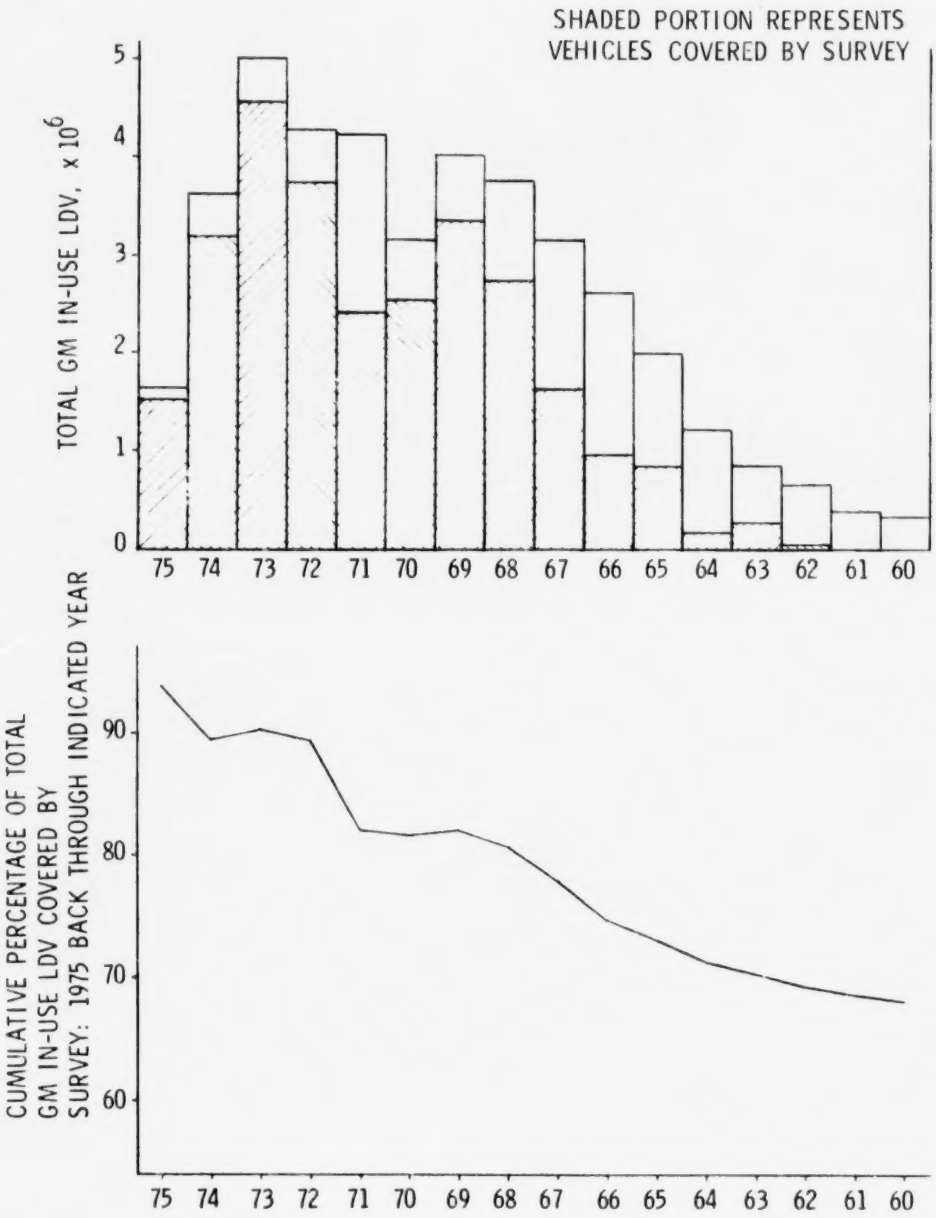

Figure 5-4. Vehicle Coverage for General Motors LDV

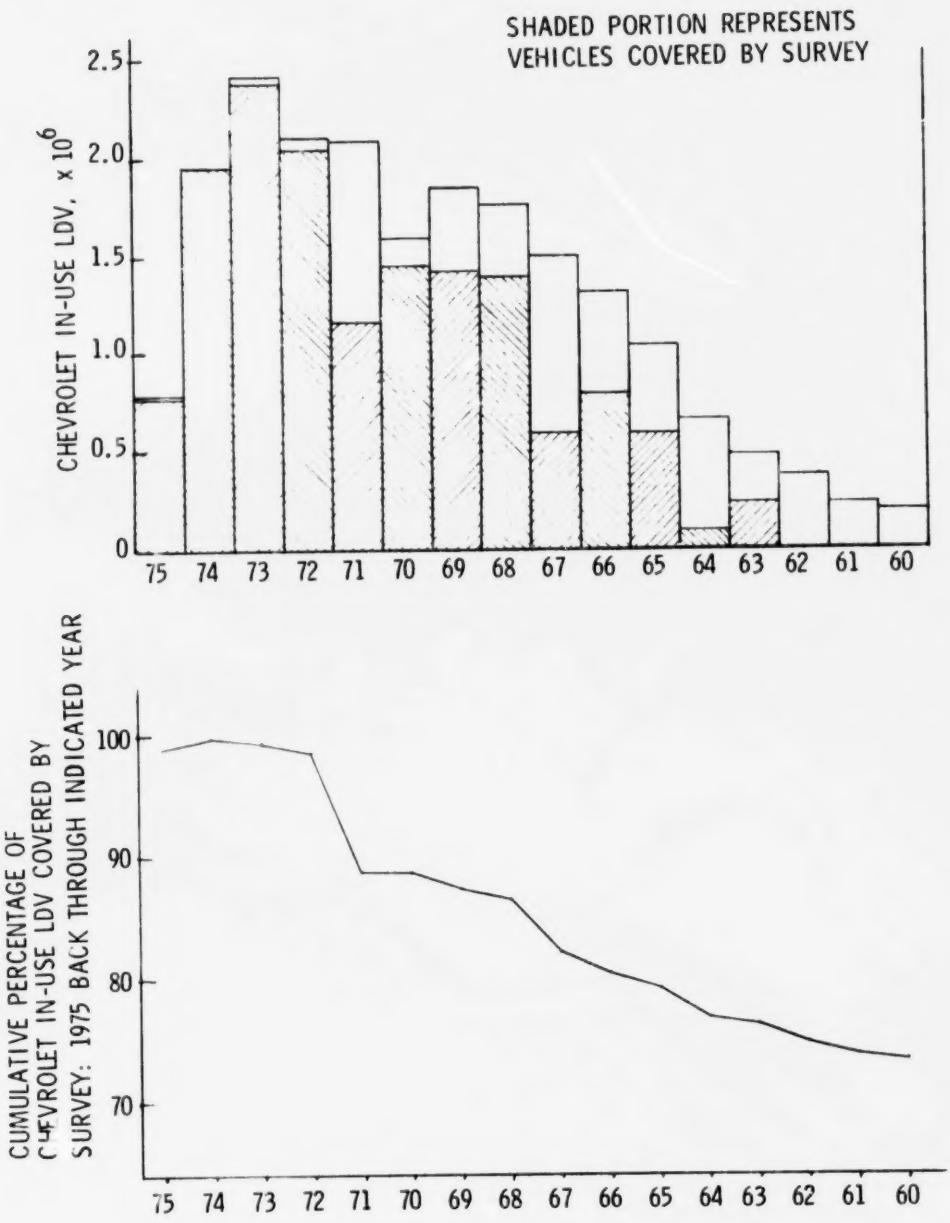

Figure 5-5. Vehicle Coverage for Chevrolet LDV

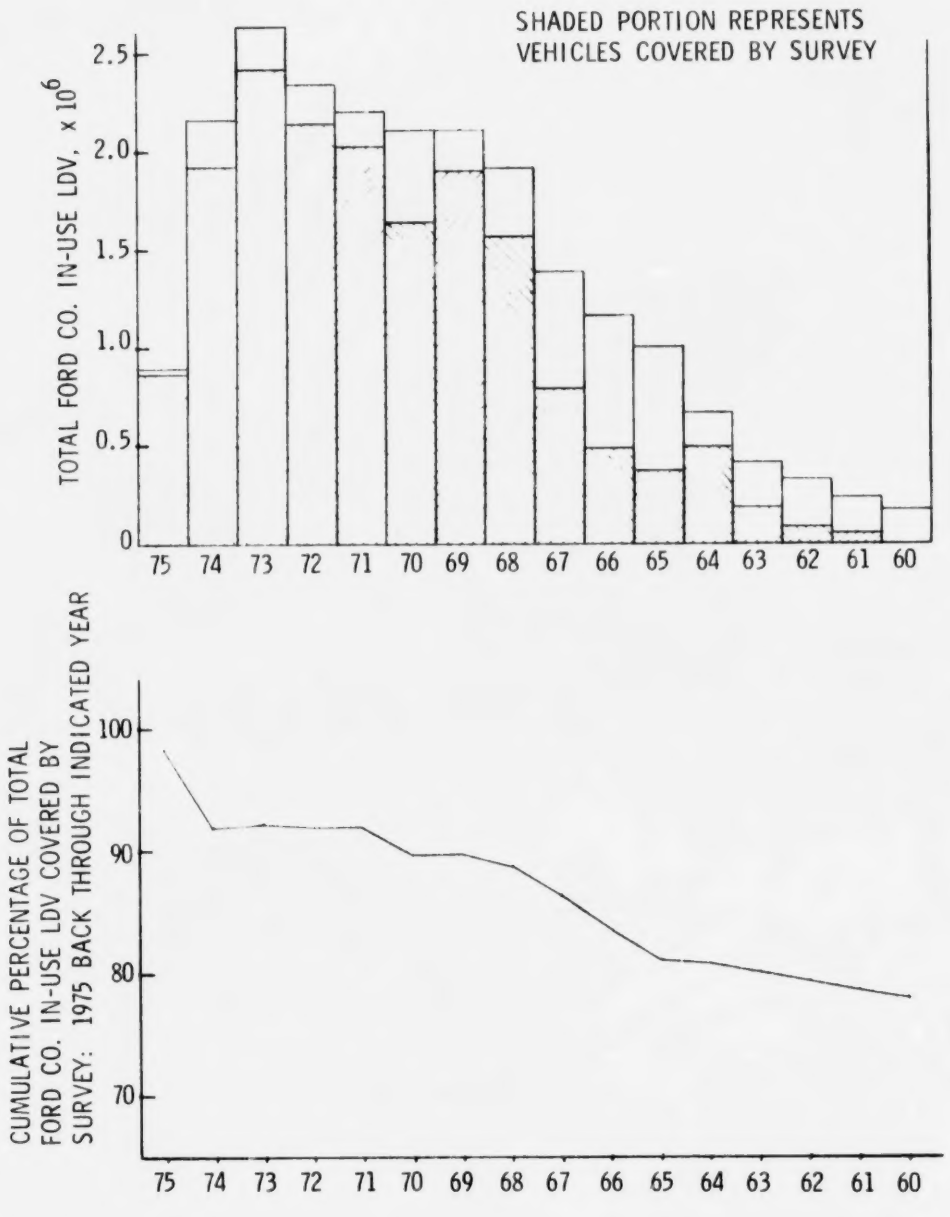
SHADED PORTION REPRESENTS
VEHICLES COVERED BY SURVEY
TOTAL FORD CO. IN-USE LDV, x 10^6
2.5
2.0
1.5
1.0
0.5
0
75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60
CUMULATIVE PERCENTAGE OF TOTAL
FORD CO. IN-USE LDV COVERED BY
SURVEY: 1975 BACK THROUGH INDICATED YEAR
100
90
80
70
75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60

Figure 5-6. Vehicle Coverage for Ford Motor Company LDV

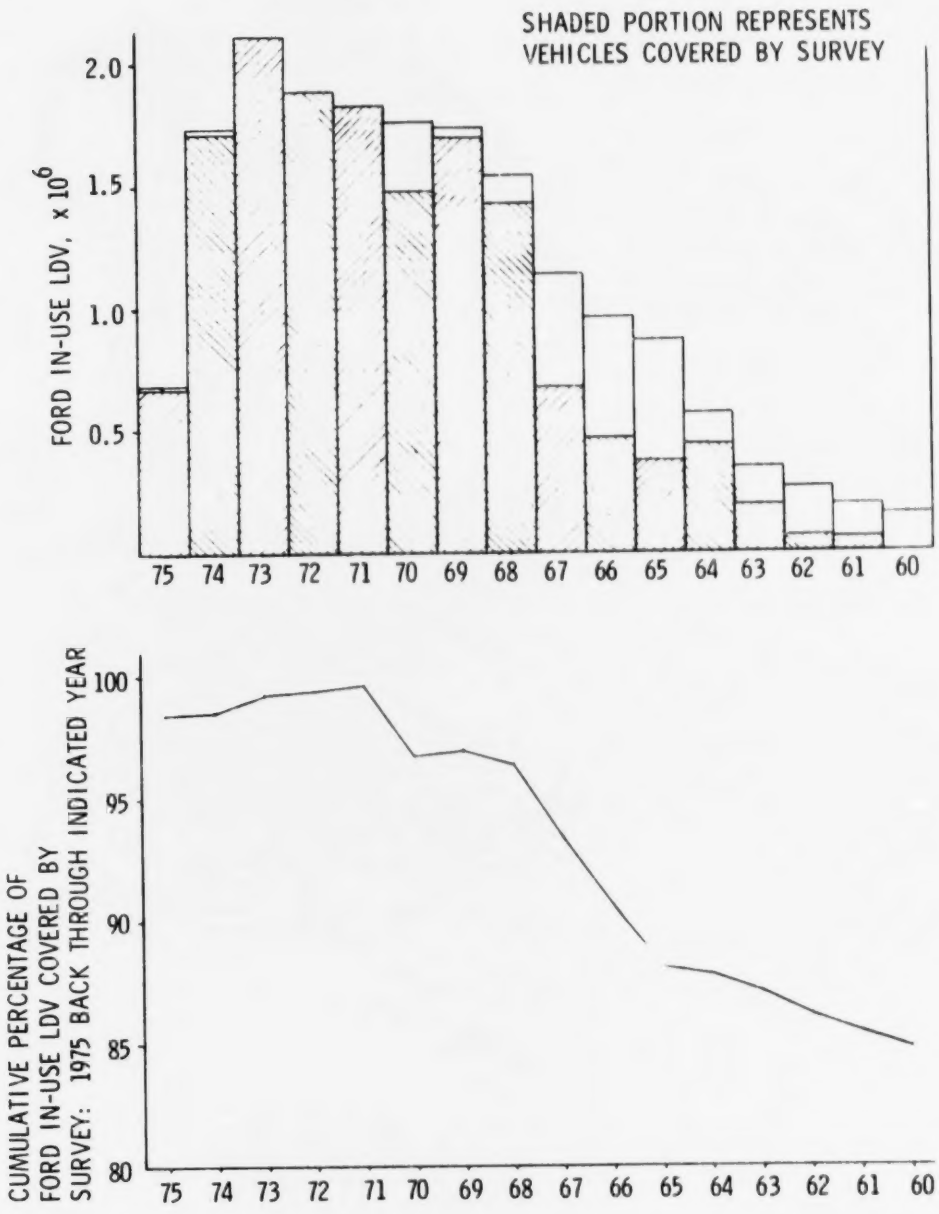

Figure 5-7. Vehicle Coverage for Ford Division LDV

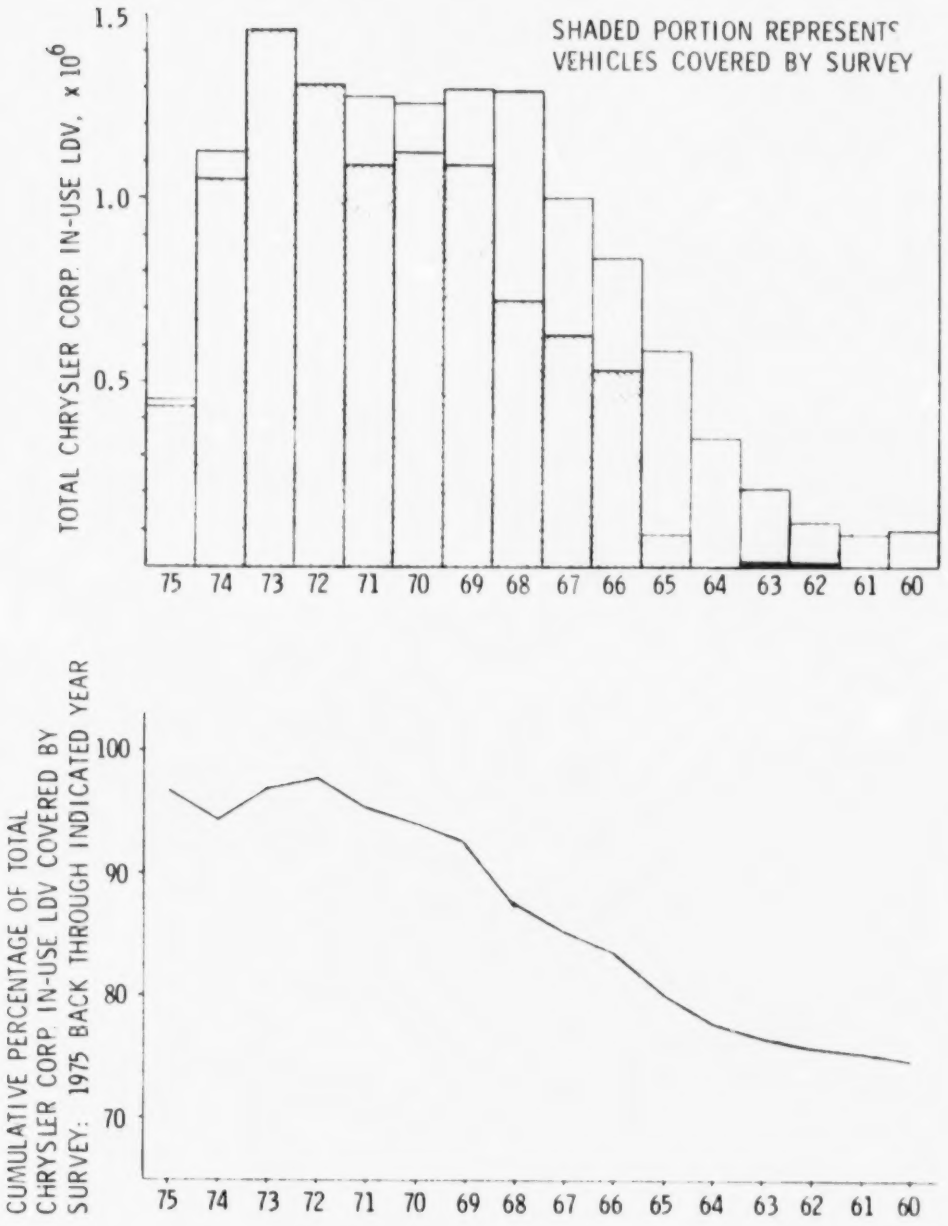
SHADED PORTION REPRESENTS VEHICLES COVERED BY SURVEY
TOTAL CHRYSLER CORP. IN-USE LDV, x 10^6
1.5
1.0
0.5
75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60
CUMULATIVE PERCENTAGE OF TOTAL CHRYSLER CORP. IN-USE LDV COVERED BY SURVEY: 1975 BACK THROUGH INDICATED YEAR
100
90
80
70
75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60

Figure 5-8. Vehicle Coverage for Chrysler Corp. LDV

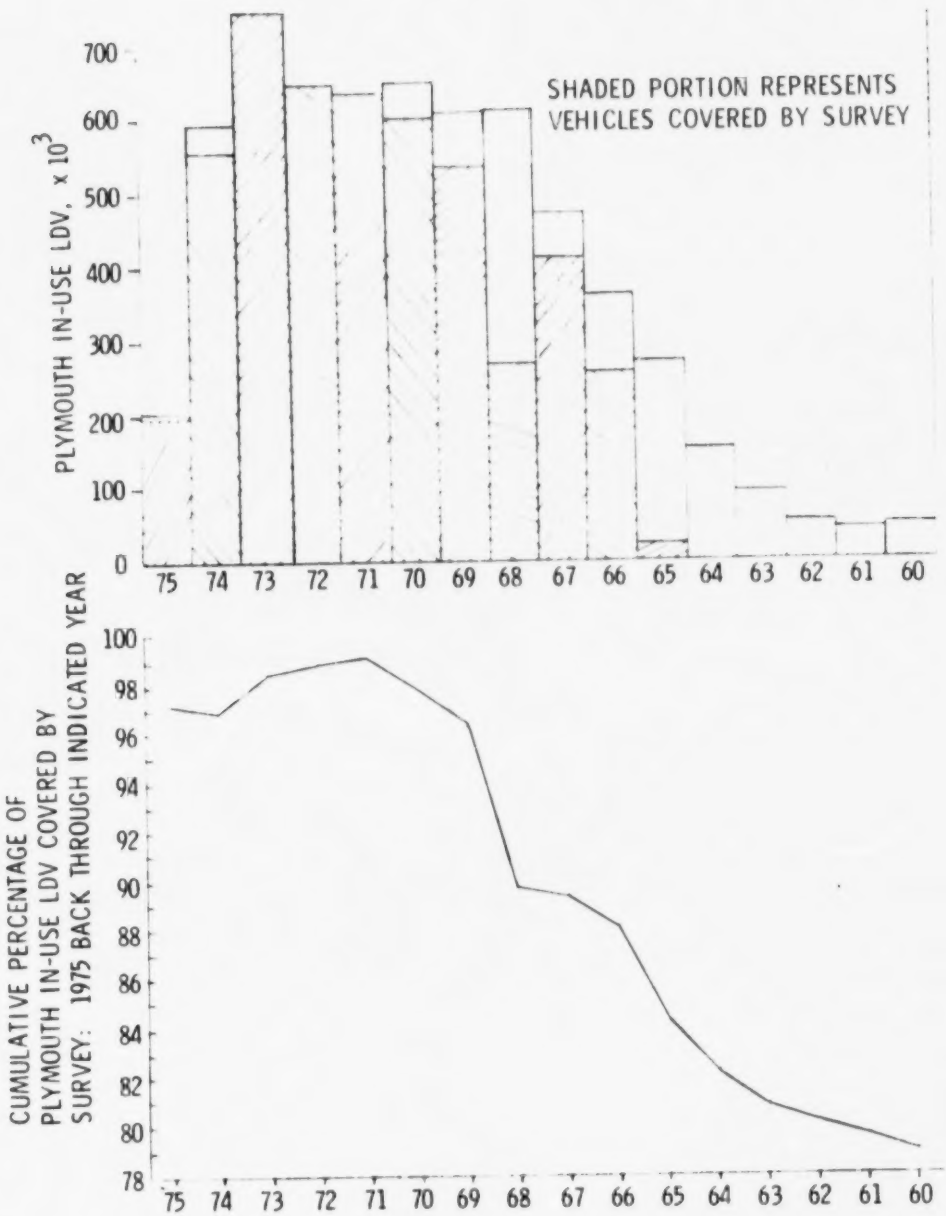

Figure 5-9. Vehicle Coverage for Plymouth LDV

the number of all in-use vehicles of that model year, whereas the shaded portion represents the number of vehicles covered by this survey. The lower curve in each figure is a plot of cumulative percentage of vehicle coverage from 1975 back through the indicated model year. These figures show the data for the following categories in the order listed:

a. Grand total LDV
b. Domestic
c. Import
d. General Motors
e. Chevrolet
f. Ford Motor Company
g. Ford Division
h. Chrysler Corporation
i. Plymouth

Thus, referring to Figure 5-2, it is shown that the total in-use domestic LDV of model year 1972 amounts to approximately 8.2 million, of which approximately 7.4 million, or 90 percent, were covered by this survey. The lower part of this same figure shows that, between the years 1975 and 1968, the vehicles covered by this survey represent 82 percent of the total in-use domestic LDV produced between 1975 and 1968. As the survey is extended back to 1960, the coverage drops to 70 percent of the total in-use domestic LDV produced between 1975 and 1960.

From these curves, it is shown that all the subgroupings of the domestic LDV have the same general trend: relatively high coverage back to about 1968 and then decreasing coverage for the older model years. For Chevrolet and General Motors, the effect due to the missing 1971 Impala is clearly evident.

5.4 VEHICLE BLOCK ASSIGNMENT

This represented the major task in the data analysis. This process converted the 709 separate LDV field sheets with their supplementary notes and comments into a more compact form suitable for computer analysis.

5.4.1 Definition

The term "vehicle block" is defined in this report as a grouping of vehicle makes and model years, all within the same manufacturing division, that have an identical fillpipe environment. This grouping was based on the information contained in the field data sheets plus the manufacturer-supplied commonality information when available. In order to be in the same vehicle block, all cars must have the same fit code for each test nozzle, and the fillpipe location, access features, and vent characteristics must be the same.

5.4.2 Procedure

The first step was to compare the field data sheets with manufacturer's commonality information when the latter was available. The purpose of this was to check whether the commonality information was, in fact, a reliable guide. This was done by examining those cars that were covered both by field testing and the commonality information. It was found that, with a few exceptions, the manufacturer's commonality guides were good indicators of cars with the same fillpipe environment and fit codes.

The commonality information was then examined for those cases of partial field test coverage of an indicated commonality group. All information on the field data sheets was considered in the evaluation of whether or not commonality should be claimed for the models missing from the field tests.

Next, it was necessary to assign a single nozzle fit code for each nozzle for that vehicle block. This was an important phase of the analysis and, in some cases, required some rather subjective judgment. Thus, it often happened that two or more vehicles were tested that should have been in the same vehicle block, according to the manufacturer's commonality information. It was not unusual in those cases to find differing test fit codes for one or more of the test nozzles. In some cases, the use of supplementary comments on the field sheets adequately resolved the discrepancy. Thus, a nozzle graded as 2B may be essentially the same as the same nozzle graded

4C on another vehicle. Fit Code 2 means latch and good seal (with manipulation because of tight access), whereas Fit Code 4 means tight access and no latch, but that the nozzle could be hand-held for a seal. The supplementary comment B means that, although the nozzle latches, the latch is broken easily by a relatively light blow or pressure to the nozzle. Comment C means that the nozzle almost latches, but pops loose as soon as hand pressure is removed. Thus, the two fit codes 2B and 4C may differ only subjectively. The nozzle would, in this example, be assigned a single fit code of 4 for the entire vehicle block unless there were other factors present which indicated that the alternative fit code would be the more appropriate average score.

In other cases of discrepancy, field note comments or photographs indicated, for example, that an "out-of-line" fit code appeared to be due to the fillpipe being closer than normal to the bumper, apparently because of production-line tolerance. In a few such cases, the out-of-line-fit code, if a minority, was deleted in favor of the majority consensus.

There were a few cases, however, in which the difference in fit code was major and could not be accounted for by any of the above factors. Those cases required a subjective judgment as to whether to delete one of the measurements from the data base or to place that vehicle in a separate vehicle block regardless of the manufacturer's commonality information. The latter was the usual resolution in these cases because the commonality information cannot be expected to be completely precise in all cases.

There were also a few cases where models were put into the same vehicle block, even though they had different fillpipe part numbers. An example of this is the Plymouth Duster and Valiant, model years 1974 through 1970. These models all had the fillpipe in the same location (viz., exposed, flush mounted on the side) such that there was no access factor. Both sets of cars had a single fit code for all three nozzles. Thus, as far as practical aspects of fillpipe/vapor recovery nozzle are concerned, these models are the same.

Models with different fillpipe part numbers were not put into the same vehicle block if there was an access compartment with a cover door (or license plate), even if all the fit codes were the same. The reason for this is that the access compartment and door make the nozzle fit situation much more dependent on slight changes to fillpipe angle or position. Consequently, two models with different fillpipe part numbers, which tested the same by the nozzles of this program, might show differing fit codes when used with some other configuration of vapor recovery nozzle.

For all of the reasons explained above, commonality was used sparingly, with the result that many vehicle blocks are comprised of a single make and model year.

5.4.3 Results

A total of 439 vehicle blocks were assigned to the domestic and import LDV covered by this survey. These vehicle blocks are compiled in Appendix A, where the composition of each is shown by make and model year.

The computer printout of the quantitative information for each vehicle block is presented in Appendix B. These data, used in conjunction with the fit code logic diagram of Figure 4-2, provide a summary of the information contained in the 709 field sheets for LDV. The data of Appendix B are the computer inputs for the data analysis described in the following section.

6. ANALYSIS OF FIELD TEST DATA

6.1 TYPE OF ANALYSIS

The analysis procedure may be best defined by referring to Figures 6-1 and 6-2 and Table 6-1. The format used for input to the computer is illustrated in Figure 6-1. The data searches that the computer performed on the data of Appendix B are defined in Figure 6-2. A total of 39 searches were performed. The categories of seal are divided into three classifications for each of the three test nozzles. The first covers those cases in which the nozzle latches relatively easily in the normal, upright (vertical) position, and seals. Fit code 1 is the optimum case in which no manipulation of the nozzle is required, other than the simple insertion motion involved in placing the nozzle in the fillpipe. Fit codes 2 and 3 mean that some manipulation is involved, such as having to latch the nozzle in a sideways position to clear a hinged license plate, after which the latched nozzle may be rotated to the vertical position. The degree of manipulation was judged to be simple enough that it would be accomplished with no difficulty by a service station attendant. In accordance with Figure 6-2, the first search category directs the computer to search all vehicle blocks that show a fit code of 1, 2, or 3 for nozzle A. The format of the resulting printout is indicated in Table 6-1, and the actual printout is given in Appendix C. For each vehicle block, n_1 denotes the number of in-use vehicles in that block. For each search category, the computer sums all values of n_1 for the vehicle blocks that fall in that search category, at the indicated hierarchy level. The total, Σn_1, is printed out. Next, that total is divided by the number of all the vehicles at that hierarchy level covered by this survey. This latter total is denoted by N_1 and is a constant for each hierarchy level. The values of N_1 for each hierarchy are shown in Figure 6-1. The quotient $|\Sigma(n_1)|/N_1$ thus defines the percentage of vehicles covered by this survey that fall into that search category. Next, the quantity N_1 is divided by the total in-use

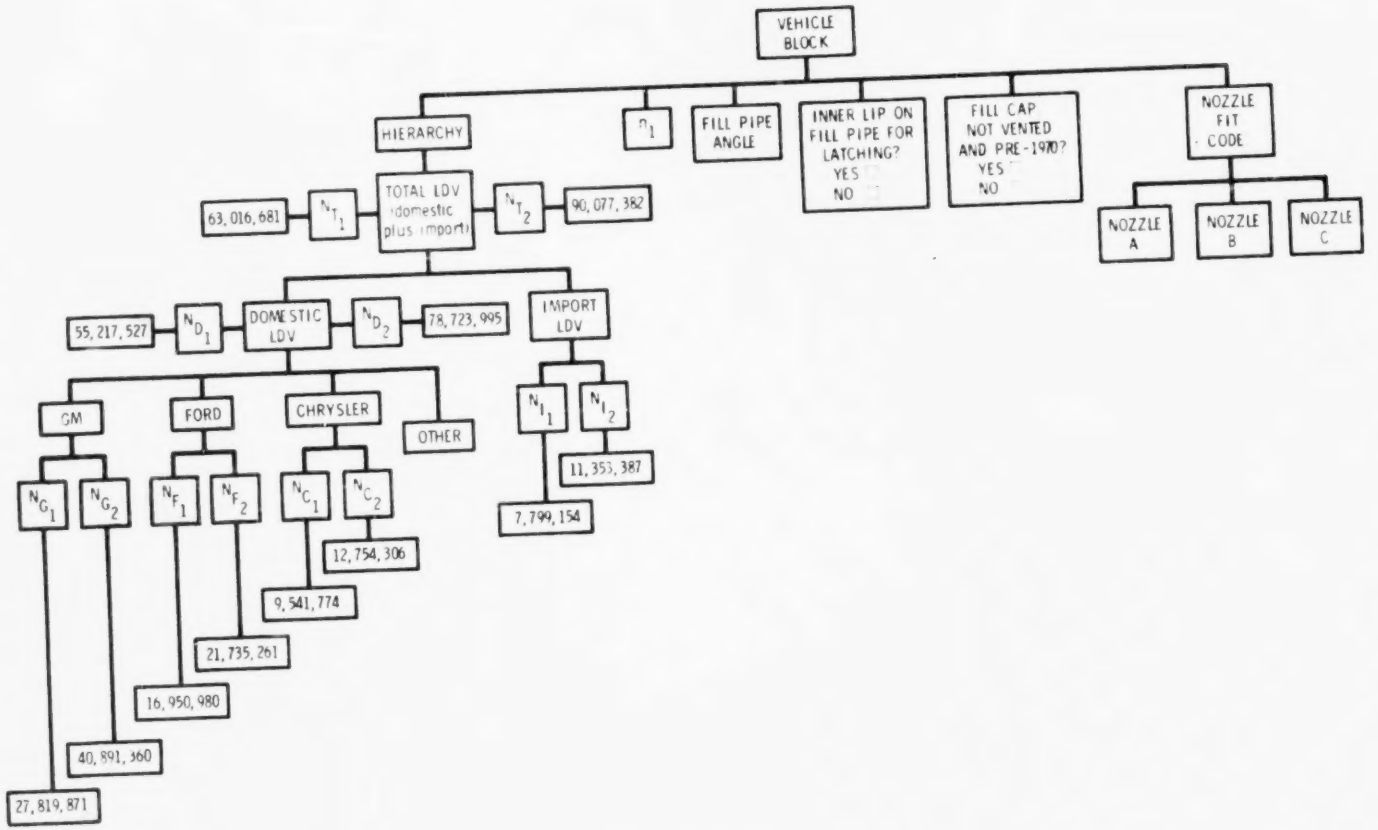

Figure 6-1. Analysis of Nozzle Fit Data - Input Data Format

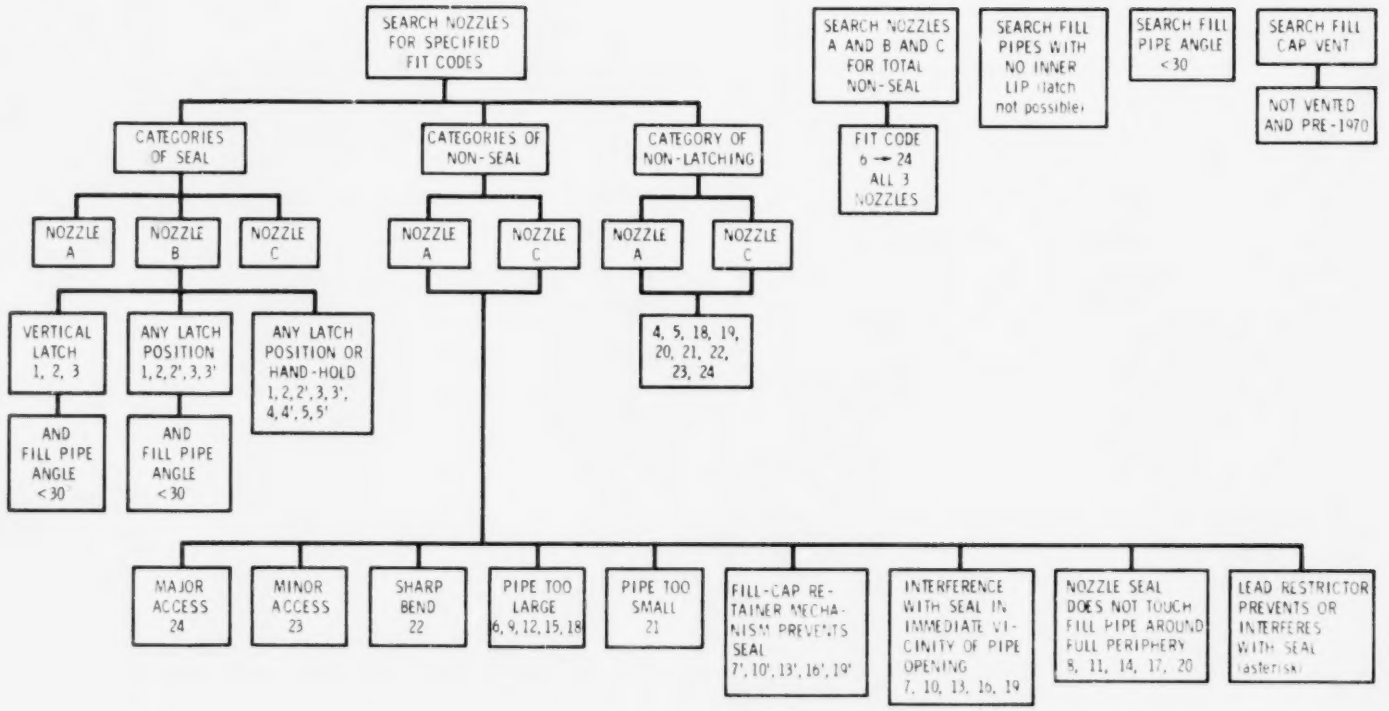
SEARCH NOZZLES FOR SPECIFIED FIT CODES
CATEGORIES OF SEAL
CATEGORIES OF NON-SEAL
CATEGORY OF NON-LATCHING
NOZZLE A
NOZZLE B
NOZZLE C
NOZZLE A
NOZZLE C
NOZZLE A
NOZZLE C
VERTICAL LATCH 1, 2, 3
ANY LATCH POSITION 1, 2, 2', 3, 3'
ANY LATCH POSITION OR HAND-HOLD 1, 2, 2', 3, 3', 4, 4', 5, 5'
4, 5, 18, 19, 20, 21, 22, 23, 24
AND FILL PIPE ANGLE < 30°
AND FILL PIPE ANGLE < 30
SEARCH NOZZLES A AND B AND C FOR TOTAL NON-SEAL
FIT CODE 6 → 24 ALL 3 NOZZLES
SEARCH FILL PIPES WITH NO INNER LIP (latch not possible)
SEARCH FILL PIPE ANGLE < 30
SEARCH FILL CAP VENT
NOT VENTED AND PRE-1970
MAJOR ACCESS 24
MINOR ACCESS 23
SHARP BEND 22
PIPE TOO LARGE 6, 9, 12, 15, 18
PIPE TOO SMALL 21
FILL-CAP RETAINER MECHANISM PREVENTS SEAL 7', 10', 13', 16', 19'
INTERFERENCE WITH SEAL IN IMMEDIATE VICINITY OF PIPE OPENING 7, 10, 13, 16, 19
NOZZLE SEAL DOES NOT TOUCH FILL PIPE AROUND FULL PERIPHERY 8, 11, 14, 17, 20
LEAD RESTRICTOR PREVENTS OR INTERFERES WITH SEAL (asterisk)

Figure 6-2. Analysis of Nozzle Fit Data - Search Categories

Table 6-1. Analysis of Nozzle Fit Data - Printout Data Format

For each of the 39 search categories of Figure 6-2, the results are given in the form of percentage of vehicles in that search category, for each hierarchy level.

A sample printout format is shown below.

Search Category 1
Nozzle A, Fit Code of (1, 2, or 3)

Hierarchy Level	Vehicles in Search Category	Percentage of Vehicles Covered by this Survey that Fall in Search Category	$\left(\frac{\text{Vehicles Covered by this Survey}}{\text{Total Vehicle Population}}\right)$
Total LDV	$\Sigma(n_1)_T$	$\Sigma(n_1)_T/N_{T_1}$	N_{T_1}/N_{T_2}
Import LDV	$\Sigma(n_1)_I$	$\Sigma(n_1)_I/N_{I_1}$	N_{I_1}/N_{I_2}
Domestic LDV	$\Sigma(n_1)_D$	$\Sigma(n_1)_D/N_{D_1}$	N_{D_1}/N_{D_2}
General Motors LDV	$\Sigma(n_1)_G$	$\Sigma(n_1)_G/N_{G_1}$	N_{G_1}/N_{G_2}
Ford LDV	$\Sigma(n_1)_F$	$\Sigma(n_1)_F/N_{F_1}$	N_{F_1}/N_{F_2}
Chrysler LDV	$\Sigma(n_1)_C$	$\Sigma(n_1)_C/N_{C_1}$	N_{C_1}/N_{C_2}

"Vehicles Covered by this Survey" represents the sum of vehicles claimed on the basis of physical testing, and those claimed on the basis of fillpipe environment commonality.

All vehicle numbers are attrition-weighted (on-the-road vehicles).

vehicles in that hierarchy level. The latter value, denoted by N_2, is a constant for each hierarchy level, and the numerical values are given in Figure 6-1. The quotient N_1/N_2 therefore defines the percentage of the total vehicle population that is covered by this survey, at the indicated hierarchy level. In all cases, vehicle numbers refer to the in-use population for model years mid-1975 through 1960.

Referring again to Figure 6-2, the next category of seal includes those cases in which the nozzle cannot be rotated to the normal vertical position after latching; that is, the nozzle must remain in a sideways position due to some sort of interference. These cases may present difficulties with some nozzle designs that rely on gravity separation of liquid and vapor within the nozzle body. The fit codes that cover these additional cases for nonvertical latch are 2′ and 3′.

The third category of seal includes those cases in which the nozzle can be hand-held for a seal, as covered by the additional fit codes of 4, 4′, 5, and 5′. Fit codes 4 and 5 mean that the nozzle will not latch. Fit codes 4′ and 5′ cover those few cases in which the nozzle latches, but, because of a sharp bend in the fillpipe, the nozzle sealing surface does not make full contact around the periphery of the fillpipe. Additional hand pressure by the operator can effect a seal in these cases, however.

In addition to the above searches, it is of interest to quantify those cars which, even though there is a latch and seal, may present some problems with spillage upon nozzle removal, because of a shallow fillpipe angle. For purposes of this report, an estimated fillpipe angle of less than 30 deg to the horizontal is considered to represent a potential problem in this respect.

The searches defined above are performed separately for each nozzle; thus, there are 15 search categories covering the various categories of seal.

The next major area of analysis was to define and quantify the various categories of non-seal. Nine categories were selected as

covering the spectrum of non-seal events observed during the field testing. These are listed in Figure 6-2. These non-seal categories are searched separately for nozzles A and C, for a total of 18 searches. The reason for omitting nozzle B is that it is intermediate in virtually every case between nozzles A and C with respect to the frequency of non-seal of each category. Nozzle A showed the highest occurrence of non-seal events and nozzle C the least. The results for these two nozzles therefore represent, approximately, the range of coverage afforded by the present generation of vapor recovery nozzles.

Additionally, it was of interest to segregate all the cases of non-latching into one group. The applicable fit codes are shown in Figure 6-2. This category was searched separately for nozzles A and C. It was next of interest to identify what may be termed the hard-core problem vehicles; those which showed non-seal for all three test nozzles. This is called the category of total non-seal in Figure 6-2.

The remaining three search categories cover physical aspects of the fillpipe or cap. The first of these identifies those cases in which a latch is not possible (with nozzle designs of the type used in this program) as the fillpipe contains no inner lip. The next search category identifies all vehicles with an estimated fillpipe angle of less than 30 deg. This segregates those cars that present potential spillage problems, regardless of the nozzle fit situation. The final search category identifies those vehicles that are pre-1970 model year and also have a non-vented fill cap. These cars have a fuel system vent other than the fill cap and may, therefore, provide a source of vapor loss while refueling.

6.2 RESULTS

The detailed computer printout results are given in Appendix C. In these printouts, the search categories appear in the same order as shown in Figure 6-2. The key results of these printouts are summarized in this section in Tables 6-2 and 6-3. The numbers given in the latter tables are the percentage of vehicles covered by this survey that fall in the indicated search

Table 6-2. Nozzle Fit Characteristics, Categories of Seal

Category of Light Duty Vehicle	Vertical Latch 1, 2, 3			Any Latch Position 1, 2, 2′, 3, 3′			Any Latch Position or Hand-Hold 1, 2, 2′, 3, 3′, 4, 4′, 5, 5′		
	A	B	C	A	B	C	A	B	C
Total	59.9	78.1	82.8	75.6	86.3	90.9	90.5	93.1	96.1
Import	51.6	57.4	60.7	52.1	57.4	60.7	84.9	86.7	90.4
Domestic	61.0	81.0	85.9	78.9	90.4	95.2	91.3	93.9	96.9
General Motors	51.9	75.1	79.1	71.4	84.4	91.3	87.0	89.6	93.8
Ford	75.9	89.3	93.0	91.2	98.3	100.0	97.8	99.3	100.0
Chrysler	60.0	84.4	91.8	79.2	95.3	97.3	93.6	99.2	99.9

Category of Light Duty Vehicle	Vertical Latch and Fillpipe Angle ≥30°			Any Latch Position and Fillpipe Angle ≥30°		
	A	B	C	A	B	C
Total	32.4	44.2	47.5	41.1	48.1	51.9
Import	48.8	54.1	56.9	49.4	54.1	56.9
Domestic	30.2	42.8	46.1	40.0	47.3	51.1
General Motors	30.6	48.2	53.2	45.5	54.8	60.4
Ford	37.1	40.4	41.1	38.4	42.2	43.9
Chrysler	16.3	31.9	34.8	26.7	35.1	37.1

Numbers represent the percentage of vehicles covered by this survey that fall in the indicated search category for nozzles A, B, and C. The code numbers for each search category refer to the applicable fit code, as defined in Figure 4-2 and Appendix B.

Table 6-3. Nozzle Fit Characteristics, Categories of Fillpipe Seal Problems

Category of Light Duty Vehicle	Categories of Non-Seal																		Non-Latching (4, 5, 18, 19, 20, 21, 22, 23, or 24)		Total Non-Seal (6–24, All Nozzles)	No Inner Lip on Fillpipe	Fillpipe Angle <10°	Fill Cap Not Vented and Pre-1970
	Major Access (24)		Minor Access (23)		Sharp Bend (22)		Pipe too Large (6, 7, 12, 15, 17)		Pipe too Small (21)		Fill Cap Retainer Device (7, 10, 15, 16, 19)		Interference with Seal (7, 10, 15, 16, 19)		Inadequate Seal Surface (8, 11, 14, 17, 20)		Lead Restrictor Interference (asterisk)							
	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C	A	C				
Total	1.9	2.1	0.9	0.3	2.4	0.5	1.0	0.5	0.1	0.0	0.4	5.0	0.6	0.3	0.0	0.3	0.2	0.1	22.9	8.4	2.8	3.8	19.6	18.6
Import	1.4	0.6	0.0	0.0	6.8	1.2	2.7	2.7	1.7	0.0	0.0	0.0	1.9	0.8	0.0	1.5	0.7	0.8	44.6	56.2	8.0	28.1	3.8	0.0
Domestic	4.1	2.5	1.0	0.3	1.7	0.1	0.8	0.2	0.1	0.0	0.5	0.5	0.4	0.2	0.0	0.1	0.1	0.0	19.8	4.5	2.0	0.4	44.6	21.3
General Motors	5.4	4.6	1.1	0.6	1.4	0.0	1.8	0.4	0.2	0.0	0.0	0.0	0.4	0.4	0.0	0.3	0.2	0.0	27.0	7.8	5.9	0.7	31.8	29.1
Ford	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3	0.0	0.0	0.0	56.1	5.4
Chrysler	0.0	0.0	2.6	0.0	2.6	0.4	0.0	0.0	0.5	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	20.6	3.0	0.4	0.0	60.2	27.8

Numbers represent the percentage of vehicles covered by this survey that fall in the indicated search category. Categories of non-seal and non-latching are listed for nozzles A and C. The code numbers under each search category refer to the applicable nozzle fit code, as defined in Figure 4-2 and Appendix B.

category. Table 6-2 summarizes the categories of seal for all three nozzles. In addition, the two categories of latch and seal are subdivided into those cars that also have an estimated fillpipe angle (with respect to the horizontal) of 30 deg or more. The category of vertical latch and seal (fit codes 1, 2, or 3) and fillpipe angle ≥ 30 deg covers the ideal case in which there are no difficulties (real or potential) in operational use. All the other categories contain one or more aspects of the fillpipe/nozzle relationship that have at least the potential of presenting some sort of difficulty with effective vapor recovery. All of the categories of seal are of interest, however, in that they show directly what percentage of in-use vehicles can be accommodated by present generation vapor recovery nozzles, for varying enforcement constraints.

All the categories of seal problems are summarized in Table 6-3. These results are self explanatory, but there are three non-seal categories that deserve some comment.

The first is that in which the fill cap retaining device interferes with the seal (fit codes 7′, 10′, 13′, 16′, 19′). Here, it is noted that nozzle C shows no vehicles at all in that category. There were some vehicles tested (the Datsun 240Z through 280Z) in which a retaining chain prevented a hand-held seal for any nozzle. These vehicles all had a fillpipe much too large for latching; thus, the fit code logic flow sheet required a fit code of 18 for all nozzles. There were some vehicles that had a hinged cap and, in some cases, this hinge interfered with the larger sealing surface of nozzle A, whereas the smaller sealing surface of nozzles B and C did not contact the hinge.

The second comment concerns that search category in which nozzle C showed the higher percentage of problems (inadequate seal surface, fit codes 8, 11, 14, 17, and 20). Nozzle A showed no cars at all in this category. The reason for this is that this fit code resulted, in virtually every case, from a sharp bend in the fillpipe. Thus, although nozzle C latched, its sealing surface was pulled away, and there was one area of the fillpipe that it did not touch. In every such case, nozzle A could not be inserted far enough to latch; therefore, it had a nonseal fit code of 22.

The third comment concerns those cases in which the fuel system has a vent other than the fill cap and, thus, would be capable of permitting some vapor loss while fueling. This comprises pre-evaporative emission control cars that have a not-vented fill cap. Two approximations were made here. First, evaporative emission controls started in 1970 in California, but were not required nationwide until the following year. For purposes of this report, all cars of 1970 and later model years are considered to have evaporative emission controls. The second approximation concerns the pre-1970 imports. The data provided by the fill cap manufacturers often did not cover these cases. It was therefore assumed that, if there was no information to the contrary, the fill cap of a pre-1970 import was vented.

Appendix D provides a listing of all the vehicle blocks that fall into each of the 39 search categories covered by the computer printouts of Appendix C. By using the data of Appendixes A through D, one can determine exactly which made and model years covered by this survey appear in each of the search categories and the number of vehicles in each case.

In summary, the results of this program are available in four different levels of detail and compactness. First, the 860 field data sheets provide all of the information concerning details of nozzle fit and fillpipe information, but in a very diffuse form. EPA is making these field sheets available to a few qualified users. At the next level, the vehicle/nozzle interface data summary of Appendix B compresses these data into 439 vehicle blocks and presents the nozzle fit code data as well as vehicle numbers and some fillpipe information. The computer search and printout results of Appendix C organize and quantify the data of Appendix B by categories of nozzle fit code and fillpipe data and represent the heart of the results of this study. This output is compressed further to provide maximum visibility to the key results in the overview Tables 6-2 and 6-3.

Last minute information received from one of the automotive manufacturers has caused a slight change in the numerical data base of this report. The timing was such that it was not possible to incorporate this change into all phases of the analyses.

At the time the vehicle block assignments described in Section 5.4 were being performed, commonality was claimed for the 1972 and 1971 model years of the Oldsmobile Delta 88 and Delta Royale on the basis of field sheet and other information available at the time. The new information from Oldsmobile was more detailed, and although it did not indicate whether or not the former assignment is correct, it was evident that it was not appropriate to assume commonality on the basis of fillpipe and bumper part numbers. The attrition-weighted number of vehicles concerned is 390,866. This represents a reduction of approximately 0.6 percent in the LDV coverage of this report. More significantly, these vehicles had all been assigned a fit code of 1 for all three nozzles (i.e., easy latch and seal). Consequently, this change does not affect the number of cars in any of the non-seal, or difficult to seal, categories. This reduction, therefore, has no significant effect on either the total vehicle coverage or the percentage of vehicles in any of the various categories of seal or nonseal.

This change has been incorporated into the vehicle coverage as shown in Figures 5-1, 5-2, 5-4, and 6-1, and in all related discussions of this report. There was not time to permit reprogramming of the computer operations, however, as given in Appendixes A through D.

7. DISCUSSION OF RESULTS

The vehicle coverage of this survey represents 70 percent of the total LDV population for model years mid-1975 through 1960. A total of 860 vehicles were field tested, of which 709 were in the LDV class. The question arises as to how well the results obtained from this coverage can be expected to apply to the remainder of the vehicle population. This question cannot be answered exactly, but it appears that the data base of this report is sufficiently broad that the results may be applied with high confidence to the total population for purposes of implementation planning. One reason for this supposition is that the older vehicles, which show a relatively lower coverage by this survey, tend to be driven less than the more recent ones and, therefore, account for less than their proportionate share of fueling operations at service stations.

A second factor to recall is that it is very likely that the coverage of this survey is significantly higher than that tabulated herein. This is due to the limited fillpipe commonality information available at this time. Complete fillpipe part number information was received from only one of the domestic manufacturers. One of the others gave some generalized information concerning fillpipe location which, although helpful in cross-checking the field sheets, was not sufficiently detailed to serve as the basis for claiming commonality.

It would appear that procuring more detailed fillpipe commonality information from the manufacturers would be the most efficient next step in expanding the data base as opposed to additional field testing. The latter was becoming noticeably less time efficient toward the end of the field program as a higher percentage of the cars on each lot were found to be already covered.

The abstracted survey results discussed below apply, strictly speaking, only to the vehicle population covered by this survey, but are

considered to be representative in all significant respects of the total in-use light duty vehicle population.

A key result of this survey is the finding that it is possible to obtain some kind of seal (including hand-hold seal) on 90 to 96 percent of the LDV population with vapor recovery nozzles of the type tested in this program. One of the test nozzles can latch and seal over 90 percent of the cars provided that it can operate satisfactorily when the nozzle is positioned sideways. If this nozzle must be in the upright, vertical position to operate properly, it can latch and seal about 83 percent of the fillpipes. The most frequent cause for having to position the nozzle sideways is limited access due to a hinged license plate or cover door over the fillpipe access compartment. One of the other nozzles is not far behind in all three categories of seal.

Concerning the non-seal events, only about 3 percent of the population could not effect a fillpipe seal of some sort (including hand-hold seal) with any of the three test nozzles. The most frequent overall cause of non-seal is a major access interference. This means that the bumper or a substantial body or sheet metal structure impedes nozzle entry. For imports, the most prevalent problems are a sharp bend in the fillpipe, fillpipe too large, and no inner lip in the fillpipe.

The estimated fillpipe angle was less than 30 deg on nearly 40 percent of all cars, and this occurred almost entirely on domestics. This may be a significant factor requiring some additional nozzle design effort to prevent spillage upon removal of the nozzle after fueling.

Another potential problem area concerns the possibility of vapor loss through fuel system vents located elsewhere than the fill cap. Approximately 20 percent of the cars now on the road may be expected to be pre-1970 and with not-vented fill caps and, thus, be in this category.

None of the other categories of non-seal appear to be significant factors affecting implementation of retrofit vapor recovery techniques.

The quantitative breakdown of these categories of seal and non-seal presented herein should be very useful for several purposes. First, they provide specific guidelines for improved nozzle designs to provide even more effective vapor recovery techniques. Second, they can serve as the basis for selection of representative test fleets for certifying specific vapor recovery nozzles. They may also be used jointly by automotive manufacturers and nozzle manufacturers to ensure efficient vapor recovery for future model year vehicles.

Finally, a few comments may be made about the light duty trucks tested during the field work. For the reasons described in Section 5.1, they could not be included at this time in the quantitative data analysis. There were 196 vehicles of this type tested, some of which were actually in the heavy duty vehicle category. These data sheets remain available for inclusion in an analysis of the type reported herein should the necessary sales or production statistics by make and model become available. Qualitatively, the pickup trucks appeared to follow the same general trends as reported for the LDV, except that major access problems were seldom encountered. Some cases of a sharp fillpipe bend were observed, and a low fillpipe angle was not uncommon. The vans characteristically had a sharp bend in the fillpipe that prevented a seal with two or more of the test nozzles.

APPENDIX A

VEHICLE BLOCK COMPOSITION

(This listing is restricted to those vehicles covered by this Survey)

LEGEND

The group of letters and digits in the left hand column is the vehicle block designation. The center column is the vehicle make, and the right hand column is the model year. Thus, all Chevrolets have a vehicle block designation beginning with "C", and all Chevelles are denoted by the number 5. The 1974 Chevelle, therefore, comprises vehicle block C5B.

VEHICLE BLOCK ASSIGNMENT

CHEVROLET

C	1	MONZA	75
C	2A	VEGA	75
C	2B	VEGA	74
C	2C	VEGA	73
C	2D	VEGA	72, 71
C	3A	VEGA WAGON	75
C	3B	VEGA WAGON	74
C	3C	VEGA WAGON	73→71
C	4A	NOVA	75
C	4B	NOVA	74
C	4C	NOVA	73
C	4D	NOVA	72
C	4E	NOVA	70
C	5A	CHEVELLE	75
C	5B	CHEVELLE	74
C	5C	CHEVELLE	73→70
C	5D	CHEVELLE	69, 68
C	5E	CHEVELLE	67
C	5F	CHEVELLE	66
C	5G	CHEVELLE	65
C	6A	MONTE CARLO	75
C	6B	MONTE CARLO	74
C	6C	MONTE CARLO	73
C	6D	MONTE CARLO	72
C	6E	MONTE CARLO	71
C	6F	MONTE CARLO	70

VEHICLE BLOCK ASSIGNMENT

CHEVROLET (CONT'D)

C 7A	BEL AIR	74
C 7B	BEL AIR	72
C 7C	BEL AIR	68
C 7D	BEL AIR	64
C 8A	IMPALA	75
C 8B	IMPALA	74
C 8C	IMPALA	73
C 8D	IMPALA	72
C 8E	IMPALA	70
C 8F	IMPALA	69
C 8G	IMPALA	68
C 8H	IMPALA	66
C 8I	IMPALA	65
C 8J	IMPALA	63
C 9A	CAPRICE	75
C 9B	CAPRICE	74
C 9C	CAPRICE	73, 72
C 9D	CAPRICE	71
C 9E	CAPRICE	70
C 9F	CAPRICE	69
C 10A	CAMARO	75
C 10B	CAMARO	74
C 10C	CAMARO	73
C 10D	CAMARO	72→70
C 10E	CAMARO	69
C 10F	CAMARO	68, 67

VEHICLE BLOCK ASSIGNMENT

CHEVROLET (CONT'D)

C	11A	CORVETTE	75
C	11B	CORVETTE	74→72
C	11C	CORVETTE	71→66
C	12	BISCAYNE	67, 66
C	13	CHEVY II (NOVA)	63
C	14	WAGON, CHEVROLET (CAPRICE ESTATE)	75
C	15	WAGON, CHEVELLE	75
C	15B	WAGON, CHEVROLET	74→67
		WAGON, CHEVELLE	74, 73
C	15C	WAGON, CHEVELLE	66

VEHICLE BLOCK ASSIGNMENT

PONTIAC

PO 1	ASTRE	75
PO 2A	VENTURA	75
PO 2B	VENTURA	74
PO 2C	VENTURA	73
PO 2D	VENTURA	72
PO 3A	LE MANS	75
PO 3B	LE MANS	74
PO 3C	LE MANS	73
PO 3D	LE MANS	72
PO 4A	TEMPEST	70
PO 4B	TEMPEST	69
PO 4C	TEMPEST	68
PO 4D	TEMPEST	67
PO 5A	CATALINA	72
PO 5B	CATALINA	69
PO 6A	BONNEVILLE	71, 70
PO 6B	BONNEVILLE	69
PO 6C	BONNEVILLE	68
PO 6D	BONNEVILLE	67
PO 6E	BONNEVILLE	65
PO 7A	GRAND VILLE	73, 72
PO 7B	GRAND VILLE	71

VEHICLE BLOCK ASSIGNMENT

PONTIAC (CONT'D)

PO	8A	GRAND PRIX	75
PO	8B	GRAND PRIX	74
PO	8C	GRAND PRIX	73
PO	8D	GRAND PRIX	72
PO	8E	GRAND PRIX	71
PO	8F	GRAND PRIX	70
PO	8G	GRAND PRIX	69
PO	9A	FIREBIRD	75
PO	9B	FIREBIRD	74
PO	9C	FIREBIRD	73
PO	9D	FIREBIRD	72
PO	9E	FIREBIRD	71
PO	9F	FIREBIRD	69
PO	9G	FIREBIRD	68
PO	9H	FIREBIRD	67
PO	10	2 + 2	66
PO	11A	WAGON, FULL SIZE (CATALINA, GRAND SAFARI, ETC.)	75
PO	11B	WAGON, FULL SIZE	72
PO	11C	WAGON, FULL SIZE	70
PO	11D	WAGON, FULL SIZE	68

VEHICLE BLOCK ASSIGNMENT

OLDS

O	1	STARFIRE	75
O	2A	OMEGA	75
O	2B	OMEGA	74
O	2C	OMEGA	73
O	3A	CUTLASS	75
O	3B	CUTLASS	74
O	3C	CUTLASS/442	73 → 71
O	3D	CUTLASS/442	70
O	3E	CUTLASS/442	69
O	3F	CUTLASS/442	68, 67
O	4A	DELTA 88	75
O	4B	DELTA 88	74
O	4C	DELTA 88	73 → 70
O	4D	DELTA 88	69
O	5A	DYNAMIC 88	65
O	5B	DYNAMIC 88	64
O	6A	98	75
O	6B	98	73
O	6C	98	69
O	7A	TORONADO	75
O	7B	TORONADO	70
O	7C	TORONADO	69
O	7D	TORONADO	68
O	7E	TORONADO	67

VEHICLE BLOCK ASSIGNMENT

OLDS (CONT'D)

O	7F	TORONADO	66
O	8A	WAGON	75
O	8B	WAGON	74 → 70

VEHICLE BLOCK ASSIGNMENT

BUICK

B	1	SKYHAWK	75
B	2	APPOLLO/SKYLARK	75
B	3A	CENTRY	75
B	3B	CENTURY	74
B	3C	CENTURY	73
B	3D	SKYLARK	72, 71
B	3E	SKYLARK/SPECIAL	69
B	3F	SKYLARK/SPECIAL	68
B	3G	SKYLARK/SPECIAL	67
B	3H	SKYLARK/SPECIAL	65
B	4A	LE SABRE	75
B	4B	LE SABRE	74
B	4C	LE SABRE	73 → 70
B	4D	LE SABRE	69 → 70
B	5A	ELECTRA	75
B	5B	ELECTRA	73
B	5C	ELECTRA	72
B	5D	ELECTRA	71
B	5E	ELECTRA	70
B	5F	ELECTRA	69
B	5G	ELECTRA	68

VEHICLE BLOCK ASSIGNMENT

BUICK (CONT'D)

B	6A	RIVIERA	75
B	6B	RIVIERA	74
B	6C	RIVIERA	73, 72
B	6D	RIVIERA	70
B	6E	RIVIERA	69
B	6F	RIVIERA	68
B	6G	RIVIERA	67
B	6H	RIVIERA	66
B	6I	RIVIERA	64
B	7	CENTURION	73, 72
B	8	WILDCAT	69
B	9A	CENTURY WAGON	75
B	9B	CENTURY WAGON	73
B	10A	BUICK WAGON (ESTATE)	75
B	10B	BUICK WAGON (ESTATE)	71
B	10C	BUICK WAGON (SPECIAL)	67

VEHICLE BLOCK ASSIGNMENT

CADILLAC

CA 1A	DE VILLE	75
CA 1B	DE VILLE	74
CA 1C	DE VILLE	73
CA 1D	DE VILLE	72
CA 1E	DE VILLE	71
CA 1F	DE VILLE	70
CA 1G	DE VILLE	69
CA 1H	DE VILLE	68
CA 1I	DE VILLE	67, 66
CA 1J	DE VILLE	65
CA 1K	DE VILLE	63
CA 1L	DE VILLE	62
CA 2A	EL DORADO	74
CA 2B	EL DORADO	73
CA 2C	EL DORADO	72, 71
CA 2D	EL DORADO	70
CA 2E	EL DORADO	69
CA 2F	EL DORADO	67
CA 3A	FLEETWOOD	70
CA 3B	FLEETWOOD	68
CA 3C	FLEETWOOD	67
CA 3D	FLEETWOOD	66
CA 3E	FLEETWOOD	63

VEHICLE BLOCK ASSIGNMENT

FORD

F	1A	PINTO	75
F	1B	PINTO	74 → 70
F	2A	PINTO WAGON	75
F	2B	PINTO WAGON	74 → 72
F	3A	MUSTANG II	75
F	3B	MUSTANG II	74
F	3C	MUSTANG	73 → 71
F	3D	MUSTANG	70
F	3E	MUSTANG	69
F	3F	MUSTANG	68
F	3G	MUSTANG	67 → 64
F	4A	MAVERICK	75
F	4B	MAVERICK	74 → 69
F	5	GRANADA	75
F	6	ELITE	75
F	7A	TORINO	75
F	7B	TORINO	74
F	7C	TORINO	73, 72
F	7D	TORINO	71
F	7E	TORINO	70
F	7F	TORINO/FAIRLANE	69
F	7G	TORINO/FAIRLANE	68, 67
F	7H	FAIRLANE/FAIRLANE 500	62
F	8A	THUNDERBIRD	75
F	8B	THUNDERBIRD	74
F	8C	THUNDERBIRD	73

VEHICLE BLOCK ASSIGNMENT

FORD (CONT'D)

F	8D	THUNDERBIRD	72
F	8E	THUNDERBIRD	71
F	8F	THUNDERBIRD	70
F	8G	THUNDERBIRD	69→67
F	9A	LTD	75
F	9B	LTD	74, 73
F	9C	LTD	72
F	9D	LTD	71
F	9E	LTD	69→67
F	10A	CUSTOM/GALAXIE	74→68
F	10B	CUSTOM/GALAXIE	69
F	10C	CUSTOM/GALAXIE	67
F	10D	GALAXIE	64
F	11A	FALCON	70
F	11B	FALCON	69
F	11C	FALCON	65, 64
F	12A	WAGONS (ALL EXCEPT PINTO)	75
F	12B	WAGONS (ALL EXCEPT PINTO & FALCON)	74→69
F	13	WAGON, FALCON	69→67

VEHICLE BLOCK ASSIGNMENT

MERCURY

M	1A	COUGAR	75
M	1B	COUGAR	73, 72
M	1C	COUGAR	71
M	1D	COUGAR	70
M	1E	COUGAR	68
M	1F	COUGAR	67
M	2A	MONTEGO	75
M	2B	MONTEGO	74
M	2C	MONTEGO	73, 72
M	2D	MONTEGO	69
M	3A	MARQUIS	75
M	3B	MARQUIS	73
M	3C	MARQUIS	71
M	3D	MARQUIS	70
M	3E	MARQUIS	69
M	4A	COMET	75
M	4B	COMET	74
M	4C	COMET	64
M	4D	COMET	62
M	5	MONARCH	75
M	6	BOBCAT (HATCHBACK & WAGON)	75
M	7A	WAGON, MONTEGO	75
M	7B	WAGON, MONTEGO	74
M	7C	WAGON, MERCURY (COLONY PARK, MONTEREY)	73, 72

VEHICLE BLOCK ASSIGNMENT

MERCURY (CONT'D)

M	7D	WAGON, MERCURY (COLONY PARK, ETC.)	71
M	7E	WAGON, MERCURY (COLONY PARK, ETC.)	70

VEHICLE BLOCK ASSIGNMENT

LINCOLN

L	1A	CONTINENTAL	75
L	1B	CONTINENTAL	74 → 71
L	1C	CONTINENTAL	70
L	1D	CONTINENTAL	69 → 66
L	2A	MARK IV	75
L	2B	MARK IV	72
L	2C	MARK III/IV	71
L	2D	MARK III	69

VEHICLE BLOCK ASSIGNMENT

PLYMOUTH

P	1A	VALIANT (INCLUDING DUSTER)	75
P	1B	VALIANT (INCLUDING DUSTER)	74 → 70
P	1C	VALIANT	69 → 67
P	2A	ROAD RUNNER, SATELLITE/ FURY, FURY II/GRAN FURY ('B' BODY)	75
P	2B	'B' BODY HARD TOP (ROAD RUNNER, SATELLITE)	74
P	2C	'B' BODY COUPE/SEDAN (ROAD RUNNER, SATELLITE)	74
P	2D	'B' BODY HARDTOP (ROAD RUNNER, SATELLITE)	73
P	2E	'B' BODY COUPE/SEDAN (ROAD RUNNER, SATELLITE)	73
P	2F	'B' BODY COUPE/SEDAN (ROAD RUNNER, SATELLITE)	72, 71
P	2G	'B' BODY HARD TOP (ROAD RUNNER, SATELLITE)	72
P	2H	'B' BODY HARD TOP (ROAD RUNNER, SATELLITE)	71
P	2I	'B' BODY (SATELLITE, ALL VERSIONS)	70
P	2J	'B' BODY (SATELLITE, BELVEDERE)	69, 68
P	2K	'B' BODY (BELVEDERE)	67, 66
P	3A	FURY III /GRAN FURY CUSTOM, GRAN COUPE-SEDAN/GRAN FURY BROCHAM	75
P	3B	'C' BODY FURIES: FURY I, FURY II/GRAN FURY, FURY III/GRAN FURY CUSTOM, GRAN COUPE-SEDAN/GRAN FURY BROGHAM	74

VEHICLE BLOCK ASSIGNMENT

PLYMOUTH (CONT'D)

P	3C	FURY III	73
P	3D	FURY III	72
P	3E	FURY I, FURY II, GRAN/ SEDAN	73, 72
P	3F	FURY I, FURY II, FURY III SPORT FURY	71
P	3G	FURY I, FURY II, FURY III, SPORT FURY	70
P	3H	FURY I, FURY II, FURY III/ SPORT FURY	69
P	3I	FURY I, FURY II, FURY III	67
P	3J	FURY I, FURY II, FURY III	66
P	4A	BARRACUDA	74 → 71
P	4B	BARRACUDA	70
P	4C	BARRACUDA	69
P	4D	BARRACUDA	68, 67
P	5A	WAGON, 'B' BODY (SATELLITE/FURY)	75
P	5B	WAGON, 'B' BODY (SATELLITE)	74 → 72
P	5C	WAGON, 'B' BODY (SATELLITE)	71
P	6A	WAGON, 'C' BODY (FURY, CUSTOM SUBURBAN)	73, 72
P	6B	WAGON, 'C' BODY (FURY CUSTOM SUBURGAN)	71
P	6C	WAGON, 'C' BODY (FURY, CUSTOM SUBURBAN)	66, 65

VEHICLE BLOCK ASSIGNMENT

DODGE

D	1A	DART	75
D	1B	DART	74 → 70
D	1C	DART	69 → 67
D	1D	DART	66, 65
D	2A	CHALLENGER	74 → 71
D	2B	CHALLENGER	70
D	3A	CORONET, CHARGER, CHARGER, SE	75
D	3B	CORONET	74
D	3C	CHARGER	74
		CORONET, CHARGER	73
D	3D	CORONET, CHARGER	72, 71
D	3E	CHARGER	70 → 68
D	3F	CORONET	70
D	3G	CORONET	69, 68
D	3H	CORONET	67, 66
D	3I	CORONET 440	62
D	4A	MONACO (ALL DESIGNATIONS)	75
D	4B	MONACO (ALL DESIGNATIONS)	74
D	4C	MONACO & POLARA	73
D	4D	MONACO & POLARA	72, 71
D	4E	MONACO & POLARA	70
D	4F	MONACO & POLARA	69
D	4G	POLARA	68

VEHICLE BLOCK ASSIGNMENT

DODGE (CONT'D)

D	5A	'B' BODY WAGON (CRESTWOOD, CORONET)	74 → 72
D	5B	'B' BODY WAGON (CRESTWOOD, CORONET)	71
D	6	'C' BODY WAGON (POLARA)	73, 72

VEHICLE BLOCK ASSIGNMENT

CHRYSLER

CH 1	CORDOBA	75
CH 2A	NEWPORT, NEWPORT CUSTOM	75
CH 2B	NEWPORT, NEWPORT CUSTOM	74
CH 2C	NEWPORT, NEWPORT CUSTOM	73, 72
CH 2D	NEWPORT, NEWPORT CUSTOM	70
CH 2E	NEWPORT, NEWPORT CUSTOM	69
CH 2F	NEWPORT, NEWPORT CUSTOM	66
CH 3A	NEW YORKER, N.Y. BROUGHAM	75
CH 3B	NEW YORKER, N. Y. BROUGHAM	73, 72
CH 3C	NEW YORKER, N. Y. BROUGHAM	68
CH 3D	NEW YORKER, N. Y. BROUGHAM	66
CH 4A	WAGON, TOWN & COUNTRY	75
CH 4B	WAGON, TOWN & COUNTRY	73, 72

VEHICLE BLOCK ASSIGNMENT

IMPERIAL

I	1A	IMPERIAL, LE BARON	75
I	1B	IMPERIAL, LE BARON	73, 72
I	1C	IMPERIAL, CROWN	63

VEHICLE BLOCK ASSIGNMENT

AMC

AM	1	PACER	75
AM	2A	MATADOR	75
AM	2B	MATADOR	74 → 72
AM	2C	MATADOR/REBEL	71, 70
AM	3A	GREMLIN	75
AM	3B	GREMLIN	72
AM	4A	HORNET	75
AM	4B	HORNET	73
AM	4C	HORNET	72
AM	5A	JAVELIN	74, 73
AM	5B	JAVELIN	73
AM	6	AMBASSADOR	70
AM	7A	RAMBLER	69
AM	7B	RAMBLER AMERICAN	69
AM	8	MATADOR WAGON	72

VEHICLE BLOCK ASSIGNMENT

ALL DOMESTIC LDV OTHER THAN BIG 4

STUDEBAKER

ST	1	CHALLENGER	64

VEHICLE BLOCK ASSIGNMENT

AUDI

AU	1A	FOX & 100 SEDAN	75
AU	1B	FOX	74, 73
		100 SEDAN	74→72
		90 SEDAN	73→71
AU	1C	100 SEDAN	71

CAPRI

CP	1A	SEDAN	75
CP	1B	SEDAN	74→71

COLT

CL	1	SEDAN	75→71

DATSUN

DA	1A	710 & 610 SEDAN	75
DA	1B	710 & 610 WAGON	75
DA	1C	710 SEDAN	74
		610 SEDAN	74, 73
DA	1D	710 WAGON	74
		610 WAGON	74, 73
DA	2A	210	75
DA	2B	B210	74
DA	3	280-Z	75
		260-Z	75, 74
		240-Z	73→70
DA	4A	510 SEDAN	72→69
DA	4B	510 WAGON	72, 71
DA	4C	510 WAGON	70, 69

VEHICLE BLOCK ASSIGNMENT

DATSUN (CONT'D)

DA	5	1200	73 → 71

FIAT

FI	1	850, 128, 124	73 → 68

ENGLISH FORD

EF	1	CORTINA	67

HONDA

HO	1	CIVIC	75 → 73

MAZDA

MA	1	RX-2	72, 71

MERCEDES-BENZ

MB	1	280 SERIES	71
MB	2	300 SERIES	67

OPEL

OP	1A	COUPE (MANTA 1900)	75
OP	1B	COUPE (MANTA)	74
OP	1C	MANTA	73, 72
		1900 COUPE/SEDAN	73 → 71
OP	2	GT	73 → 70
OP	3	KADETT SEDAN	70 → 68
OP	4	1900 WAGON	73

PORSCHE

PR	1	914	75
PR	2A	911	73
PR	2B	911	70
PR	2C	912	68

VEHICLE BLOCK ASSIGNMENT

TOYOTA

TO	1A	COROLLA SEDAN (1600)	67
TO	1B	COROLLA SEDAN (1600)	67 → 71
TO	1C	COROLLA SEDAN (1200)	67, 69
TO	2A	COROLLA WAGON	67
TO	2B	COROLLA WAGON	67 → 71
TO	2C	COROLLA WAGON (1200)	67
TO	3A	CORONA SEDAN	67
TO	3B	CORONA SEDAN	67
TO	3C	CORONA SEDAN	67 → 71
TO	3D	CORONA SEDAN	67, 69
TO	3E	CORONA SEDAN	69
TO	4A	CORONA WAGON	67
TO	4B	CORONA WAGON	67, 71
TO	5	MARK II SEDAN	72 →
TO	6A	MARK II WAGON	72
TO	6B	MARK II WAGON	72, 73
TO	7A	CELICA	71
TO	7B	CELICA	71
TO	7C	CELICA	71
TO	7D	CELICA	72
TO	7E	CELICA	73
TO	8	CARINA	72

VEHICLE BLOCK ASSIGNMENT

VOLKSWAGEN

VW	1A	BEETLE	75
VW	1B	BEETLE	74 → 72
VW	1C	BEETLE	71 → 68
VW	1D	BEETLE	67 → 64
VW	2A	BUS	75
VW	2B	BUS	74
VW	2C	BUS	73, 72
VW	2D	BUS	71
VW	2E	BUS	70
VW	3A	FASTBACK/SQUAREBACK	72
VW	3B	FASTBACK/SQUAREBACK	69
VW	3C	FASTBACK/SQUAREBACK	68
VW	3D	FASTBACK/SQUAREBACK	66
VW	4A	411/412 SEDAN/WAGON	74 → 72
VW	4B	411/412 SEDAN/WAGON	71
VW	5	RABBIT	75
VW	6A	DASHER	75
VW	6B	DASHER	74
VW	7	SCIROCCO	75

IMPORT LDV NOT INCLUDED IN DATA ANALYSIS

The following import LDV were physically tested, but are not included in the data analysis at this time, due to incomplete or missing sales or production information.

Manufacturer	Model	Year
Alfa-Romero	GT	74, 71, 65
BMW	530 i	75
	Bavaria	75
	3.0 Si	75
	1600	70
British Leyland		
Austin	Marina	73
MG	Midget	73
	MG-B	73, 72
	MG-B GT	71, 70, 69, 68
Triumph	Spitfire	74, 73, 70
	GT-6	73, 69, 68
	TR-6	72, 70
Fuji Heavy Ind. (Subaru)	GL Sedan	75, 72
	DL Sedan	74
	Wagon	75, 74
	Bus	69
Jensen Motors	Jensen Healey	74
Lotus	Elite	74
Mitsubishi	Plymouth Cricket	71
SAAB	99E	72

APPENDIX B

VEHICLE BLOCK DATA SUMMARY

LEGEND

This appendix presents the nozzle fit code information and other vehicle data for each of the vehicle blocks defined in Appendix A. The symbols used in the computer tabulation are defined below.

HIERARCHY

Division:
- P Plymouth
- O Oldsmobile, etc.

Manufacturer:
- CH Chrysler, etc.

Category:
- DV Domestic LDV
- IV Import LDV

VEHICLE BLOCK

Same as given in "Vehicle Block Assignment" sheets.

n_1

Number of attrition weighted (on-the-road) vehicles in each vehicle block.

ANGLE

Fillpipe angle (as shown in center of Field Data Sheet).

If fillpipe is curved, angle given is the nozzle angle (in the latched position) for nozzle A.

If nozzle A does not latch, angle given is the nozzle angle (in the latched position) for nozzle B.

If nozzle B does not latch, angle given is the nozzle angle (in the latched position) for nozzle C.

If no nozzle latches, or if for any other reason fillpipe angle cannot be estimated, "99" is entered as the nozzle angle.

A negative nozzle angle (if used to represent the effective fillpipe angle) is entered as 0 degrees.

LIP

1 Denotes fillpipe does have an inner lip for latching.
0 Denotes no inner lip on fillpipe (latch not possible).

VENT	1 Denotes fill cap not vented, and vehicle is pre-1970. 0 Denotes either fill cap vented, or vehicle is 1970 or later.
NOZZLE FIT CODES	Same as fit code logic diagram (Figure 4.2) with the following additions.
2, 3	Nozzle latches in vertical position, but with the indicated type of manipulation.
2', 3'	Nozzle cannot latch in vertical position; must remain sideways. If nozzle must be held sideways to latch, but then can be rotated to vertical position, fit code becomes 2, 3.
4', 5'	Nozzle latches but does not seal (e.g., due to a sharp bend), but nozzle can then be pressed in further for a hand-held seal
7', 10', 13', 16', 19'	Fill cap retaining device interferes with seal.

Asterisk (with any fit code other than 1, 2, 3): Lead restrictor interferes with seal) (1975 LDV only).

NOTE On the keypunch sheet, the "prime" mark is written as a diagonal

2' = 2/

A "$" after the fit code means that the conventional nozzle (OPW-7) was also tested; this was only done in certain cases which showed an access problem for the vapor recovery nozzles.

A "1" immediately after the "$" means that the conventional nozzle did show the same sort of access problem as that indicated for that particular vapor recovery nozzle.

A "0" immediately after the "$" means that the conventional nozzle did not show the access problem noted for that particular vapor recovery nozzle.

Hierarchy				Vehicle Block		n_j	Angle	Lag	Vert	SOURCE CODES A	B	C
P	CH	DV	P	01	A	114994	15	1	0	01	01	01
P	CH	DV	P	01	B	1414840	15	1	0	01	01	01
P	CH	DV	P	01	C	212512	15	1	1	01	01	01
P	CH	DV	P	02	A	54067	40	1	0	01	01	01
P	CH	DV	P	02	B	58194	20	1	0	02/	01	01
P	CH	DV	P	02	C	58194	20	1	0	02/	01	01
P	CH	DV	P	02	D	76923	20	1	0	01	01	01
P	CH	DV	P	02	E	76929	25	1	0	04	02/	02/
P	CH	DV	P	02	F	114541	20	1	0	05	01	01
P	CH	DV	P	02	G	58742	40	1	0	01	01	01
P	CH	DV	P	02	H	55799	40	1	0	04	02/	02/
P	CH	DV	P	02	I	116591	30	1	0	05	01	01
P	CH	DV	P	02	J	339806	30	1	1	02/	01	01
P	CH	DV	P	02	K	184467	20	1	1	01	01	01
P	CH	DV	P	03	A	14518	40	1	0	01	01	01
P	CH	DV	P	03	B	89615	40	1	0	01	01	01
P	CH	DV	P	03	C	111057	15	1	0	02/	01	01
P	CH	DV	P	03	D	107300	15	1	0	01	01	01
P	CH	DV	P	03	E	135715	20	1	0	01	01	01
P	CH	DV	P	03	F	198419	35	1	0	01	01	01
P	CH	DV	P	03	G	210307	30	1	0	01	01	01
P	CH	DV	P	03	H	246600	15	1	1	01	01	01
P	CH	DV	P	03	I	200474	15	1	1	02/	02/	02/
P	CH	DV	P	03	J	140435	30	1	1	02/	02/	01
P	CH	DV	P	04	A	58528	80	1	0	22 50	22 50	01
P	CH	DV	P	04	B	37437	-99	1	0	22	22	22
P	CH	DV	P	04	C	29482	20	1	1	07/	01	01
P	CH	DV	P	04	D	79230	30	1	1	01	01	01
P	CH	DV	P	05	A	7018	20	1	0	07	01	01
P	CH	DV	P	05	B	62831	-99	1	0	14 50	05	05
P	CH	DV	P	05	C	19980	40	1	0	01	02/50	02/50
P	CH	DV	P	06	A	83312	-99	1	0	05	05	05
P	CH	DV	P	06	B	45893	-99	1	0	05	05	05
P	CH	DV	P	06	C	46709	85	1	0	21	05	01
L	CH	LV	L	01	A	81232	15	1	0	01	01	01
L	CH	LV	L	01	B	1055326	20	1	0	01	01	01
D	CH	DV	D	01	C	360581	20	1	1	01	01	01
D	CH	DV	D	01	D	144569	60	1	1	22 50	01	01
D	CH	DV	D	02	A	85359	30	1	0	01	01	01
D	CH	DV	D	02	B	71628	15	1	0	01	01	01
D	CH	DV	D	03	A	48906	35	1	0	01	01	01
D	CH	DV	D	03	B	46591	30	1	0	02/	01	01
D	CH	DV	D	03	C	185098	30	1	0	05	01	01
D	CH	DV	D	03	D	248841	40	1	0	23 50	02	01
D	CH	DV	D	03	F	184405	60	1	0	05	01	01
D	CH	DV	D	03	F	90767	15	1	0	02/	02/	01
L	CH	LV	L	03	G	274092	15	1	1	05	02/	01
D	CH	DV	D	03	H	231967	80	1	0	01	01	01

D	CH	DV	D	03	A	4812	40	1	0	01	01	01
D	CH	DV	D	04	A	18502	40	1	0	01	01	01
D	CH	DV	D	04	B	54448	40	1	0	01	01	01
D	CH	DV	D	04	C	95261	40	1	0	02/	01	01
D	CH	DV	D	04	D	183363	30	1	0	01	01	01
D	CH	DV	D	04	E	79751	15	1	0	01	01	01
D	CH	DV	D	04	F	89667	30	1	1	02/$1	02/$1	01
D	CH	DV	D	04	G	76113	15	1	1	02/	01	01
D	CH	DV	D	05	A	54426	-99	1	0	05 $0	05 $0	05 $0
D	CH	DV	D	05	B	20591	-99	1	0	05 $0	05 $0	01
D	CH	DV	D	06		34439	-99	1	0	05 $0	05 $0	01
CH	CH	DV	CH	01		73612	30	1	0	01	01	01
CH	CH	DV	CH	02	A	21293	30	1	0	02/	01	01
CH	CH	DV	CH	02	B	59338	30	1	0	02/	01	01
CH	CH	DV	CH	02	C	207418	30	1	0	02/	01	02/
CH	CH	DV	CH	02	D	87627	20	1	0	02/	02/	01
CH	CH	DV	CH	02	E	116348	30	1	1	01	01	01
CH	CH	DV	CH	02	F	81113	20	1	1	05	01	01
CH	CH	DV	CH	03	A	9782	30	1	0	04	01	01
CH	CH	DV	CH	03	B	85331	10	1	0	02/	01	01
CH	CH	DV	CH	03	C	36692	20	1	1	02/	01	01
CH	CH	DV	CH	03	D	26075	20	1	1	02/$1	01	02/$1
CH	CH	DV	CH	04	A	2563	35	1	0	01	23	01
CH	CH	DV	CH	04	B	32703	-99	1	0	05	05	01
I	CH	DV	I	01	A	3276	25	1	0	02/	01	01
I	CH	DV	I	01	B	26129	15	1	0	02	01	01
I	CH	DV	I	01	C	3420	-99	1	1	16	01	01
F	F	DV	F	01	A	79572	15	1	0	01	01	01
F	F	DV	F	01	B	1132314	20	1	0	01	01	01
F	F	DV	F	02	A	49399	10	1	0	01	01	01
F	F	DV	F	02	B	496867	15	1	0	01	01	01
F	F	DV	F	03	A	104398	25	1	0	01	01	01
F	F	DV	F	03	B	327253	00	1	0	01	01	01
F	F	DV	F	03	C	320489	15	1	0	01	01	01
F	F	DV	F	03	D	154738	05	1	0	01	01	01
F	F	DV	F	03	E	241168	15	1	0	10/	02/	02/
F	F	DV	F	03	F	263811	00	1	0	03/	01	01
F	F	DV	F	03	G	943751	10	1	0	01	01	01
F	F	DV	F	04	A	67601	05	1	0	02/	02/	02/
F	F	DV	F	04	B	1470386	10	1	0	01	01	01
F	F	DV	F	05		161747	15	1	0	03/	01	01
F	F	DV	F	06		45644	-99	1	0	02/	02/	02/
F	F	DV	F	07	A	51663	15	1	0	02/	02/	01
F	F	DV	F	07	B	292972	10	1	0	02/	02/	02/
F	F	DV	F	07	C	651168	15	1	0	01	01	01
F	F	DV	F	07	D	260664	15	1	0	02/	01	01
F	F	DV	F	07	E	290318	10	1	0	02	01	01

F	F	DV	F	07	F	280632	15	1	1	02/	02/	01
F	F	DV	F	07	G	822520	10	1	1	02/	01	01
F	F	DV	F	07	H	57928	20	1	0	02/	01	01
F	F	DV	F	08	A	16007	10	1	0	01	01	01
F	F	DV	F	08	B	46365	15	1	0	01	01	01
F	F	DV	F	08	C	78862	15	1	0	02/	01	01
F	F	DV	F	08	D	52136	00	1	0	01	01	01
F	F	DV	F	08	E	37334	40	1	0	01	01	01
F	F	DV	F	08	F	40376	35	1	0	01	01	01
F	F	DV	F	08	G	143879	40	1	0	01	01	01
F	F	DV	F	09	A	95936	30	1	0	01	01	01
F	F	DV	F	09	B	560648	40	1	0	01	01	01
F	F	DV	F	09	C	315770	45	1	0	01	01	01
F	F	DV	F	09	D	311421	50	1	0	05	01	01
F	F	DV	F	09	F	471252	45	1	0	01	01	01
F	F	DV	F	10	A	1912064	45	1	0	01	01	01
F	F	DV	F	10	B	227026	45	1	0	04	02/	02/
F	F	DV	F	10	C	161691	30	1	1	04	04	02/
F	F	DV	F	10	D	55057	45	1	1	04	01	01
F	F	DV	F	11	A	4098	15	1	0	01	01	01
F	F	DV	F	11	B	50498	40	1	0	01	01	01
F	F	DV	F	11	C	134252	00	1	0	02/$1	01	01
F	F	DV	F	12	A	48325	40	1	0	01	01	01
F	F	DV	F	12	B	1474571	45	1	0	01	01	01
F	F	DV	F	13		119892	45	1	0	22 $0	22 $0	01
M	F	DV	M	01	A	21108	15	1	0	02/	02/	02
M	F	DV	M	01	B	101862	20	1	0	05 $0	02/$1	02/$1
M	F	DV	M	01	C	46352	30	1	0	02/	02/	02/
M	F	DV	M	01	D	62451	05	1	0	02/	02/	01
M	F	DV	M	01	E	93629	20	1	0	05 $1	02	02
M	F	DV	M	01	F	90338	20	1	0	05 $0	02/$1	01
M	F	DV	M	02	A	14505	10	1	0	02	02	01
M	F	DV	M	02	B	69142	10	1	0	02/	01	01
M	F	DV	M	02	C	212695	15	1	0	01	01	01
M	F	DV	M	02	D	87943	35	1	0	01	01	01
M	F	DV	M	03	A	24361	10	1	0	01	01	01
M	F	DV	M	03	B	78030	45	1	0	01	01	01
M	F	DV	M	03	C	72441	60	1	0	01	01	01
M	F	DV	M	03	D	58169	45	1	0	01	01	01
M	F	DV	M	03	E	63057	40	1	0	01	01	01
M	F	DV	M	04	A	22443	05	1	0	02/	01	01
M	F	DV	M	04	B	82565	15	1	0	02/	01	01
M	F	DV	M	04	C	53083	30	1	0	02/	01	01
M	F	DV	M	04		21755	30	1	0	02/	01	01
M	F	DV	M	05		53572	05	1	0	03/	01	01
M	F	DV	M	06		9514	25	1	0	01	01	01
M	F	DV	M	07	A	1229	40	1	0	01	01	01
M	F	DV	M	07	B	8279	45	1	0	01	01	01

M	P	DV	M	07	C	40886	45	1	0	05	01	01
M	P	DV	M	07	D	24177	40	1	0	01	01	01
M	P	DV	M	07	E	23861	40	1	0	01	01	01
L	P	DV	I	01	A	21633	15	1	0	01	01	01
L	P	DV	I	01	A	163939	30	1	0	01	01	01
L	P	DV	I	01	C	32860	15	1	0	05	01	01
L	P	DV	I	01	D	128946	15	1	0	01	01	01
L	P	DV	I	02	A	17709	15	1	0	01	01	01
L	P	DV	I	02	B	46358	05	1	0	02/	01	01
L	P	DV	I	02	C	28933	40	1	0	01	01	01
L	P	DV	I	02	D	16794	30	1	0	01	01	01
C	GM	DV	C	01		49791	30	1	0	01	01	01
C	GM	DV	C	02	A	78670	30	1	0	22	01	01
C	GM	DV	C	02	B	241653	30	1	0	22	01	01
C	GM	DV	C	02	C	336259	30	1	0	02/	02/	01
C	GM	DV	C	02	D	523467	25	1	0	01	01	01
C	GM	DV	C	03	A	33567	20	1	0	22	22	01
C	GM	DV	C	03	B	84654	30	1	0	05	22 $0	01
C	GM	DV	C	03	C	227090	20	1	0	01	01	01
C	GM	DV	C	04	A	129795	30	1	0	05	01	01
C	GM	DV	C	04	B	302811	30	1	0	12	02/	01
C	GM	DV	C	04	C	328462	30	1	0	02/	02/	02/
C	GM	DV	C	04	D	293486	30	1	0	03	01	01
C	GM	DV	C	04	E	228617	20	1	0	02/	01	01
C	GM	DV	C	05	A	106171	45	1	0	01	01	01
C	GM	DV	C	05	B	290618	50	1	0	02	01	01
C	GM	DV	C	05	C	1259145	25	1	0	01	01	01
C	GM	DV	C	05	D	578452	25	1	1	01	01	01
C	GM	DV	C	05	E	260036	35	1	1	24	24	01
C	GM	DV	C	05	F	227632	30	1	1	05	01	01
C	GM	DV	C	05	G	134666	30	1	1	02/	01	01
C	GM	DV	C	06	A	114426	45	1	0	01	01	01
C	GM	DV	C	06	B	275450	45	1	0	02/	01	01
C	GM	DV	C	06	C	295347	20	1	0	24	24	02/
C	GM	DV	C	06	D	190025	20	1	0	01	01	01
C	GM	DV	C	06	E	141413	00	1	0	02/$1	02/$1	02/$1
C	GM	DV	C	06	F	115305	25	1	0	01	01	01
C	GM	DV	C	07	A	20198	60	1	0	04	01	02/
C	GM	DV	C	07	B	37390	30	1	0	05	02/	02/
C	GM	DV	C	07	C	123179	40	1	1	02/	01	01
C	GM	DV	C	07	D	86593	40	1	0	01	01	02/
C	GM	DV	C	08	A	88455	60	1	0	23	02*	23
C	GM	DV	C	08	B	311696	45	1	0	02/	04	04
C	GM	DV	C	08	C	473086	30	1	0	05	02	/*
C	GM	DV	C	08	D	529209	30	1	0	04	04	02/
C	GM	DV	C	08	E	434648	30	1	0	01	01	01
C	GM	DV	C	08	F	637094	40	1	1	24 $0	24 $0	24 $0

C	GM	DV	C	08	G	595347	45	1	1	01	02		01				
C	GM	DV	C	08	H	458231	40	1	1	05	24	$0	24	$0			
C	GM	DV	C	08	I	487550	40	1	1	01	01		01				
C	GM	DV	C	08	J	184157	30	1	0	02	01		01				
C	GM	DV	C	09	A	50057	60	1	0	23	23	•	23				
C	GM	DV	C	09	B	137370	70	1	0	23	01		04				
C	GM	DV	C	09	C	361251	25	1	0	24	02	/	02	/			
C	GM	DV	C	09	D	135094	35	1	0	02	02	/	01				
C	GM	DV	C	09	E	64637	40	1	0	04	01		01				
C	GM	DV	C	09	F	109115	35	1	1	01	01		01				
C	GM	DV	C	10	A	66876	45	1	0	04	04		01				
C	GM	DV	C	10	B	130446	40	1	0	02	02		01				
C	GM	DV	C	10	C	104958	85	1	0	02	02	/	01				
C	GM	DV	C	10	D	296975	45	1	0	04	01		01				
C	GM	DV	C	10	E	158440	40	1	0	01	23		02				
C	GM	DV	C	10	F	356779	15	1	0	01	01		01				
C	GM	DV	C	11	A	20867	90	1	0	05	05		05				
C	GM	DV	C	11	B	83013	40	0	0	05	05		05				
C	GM	DV	C	11	C	125335	90	0	0	1H	1H		1H				
C	GM	DV	C	12		139944	30	1	1	01	01		01				
C	GM	DV	C	13		55860	10	1	0	01	01		01				
C	GM	DV	C	14		31142	10	1	0	23	01		23				
C	GM	DV	C	15	A	20618	30	1	0	01	01		01				
C	GM	DV	C	15	B	1016723	40	1	0	01	01		01				
C	GM	DV	C	15	C	18776	70	1	0	01	01		01				
FO	GM	DV	FO	01		23994	15	1	0	23	01		01				
FO	GM	DV	FO	02	A	24133	40	1	0	02	01		01				
FO	GM	DV	FO	02	B	59283	80	1	0	02	01		01				
FO	GM	DV	FO	02	C	75265	30	1	0	02	$1	02	$1	02	$1		
FO	GM	DV	FO	02	D	60581	30	1	0	01	01		01				
FO	GM	DV	FO	03	A	40996	85	1	0	23	•	23	•	01			
FO	GM	DV	FO	03	B	122409	45	1	0	02	/	01		01			
FO	GM	DV	FO	03	C	206624	15	1	0	01		01		01			
FO	GM	DV	FO	03	D	154761	30	1	0	01		01		01			
FO	GM	DV	FO	04	A	170441	40	1	0	01		01		01			
FO	GM	DV	FO	04	B	242034	20	1	1	01		01		01			
FO	GM	DV	FO	04	C	271203	30	1	1	01		01		01			
FO	GM	DV	FO	04	D	214630	15	1	1	05		1		01			
FO	GM	DV	FO	05	A	166365	15	1	0	01		01		01			
FO	GM	DV	FO	05	B	183612	45	1	1	03	/	01		01			
FO	GM	DV	FO	06	A	86137	30	1	0	01		01		01			
FO	GM	DV	FO	06	B	7m561	45	1	1	01		01		01			
FO	GM	DV	FO	06	C	74040	45	1	1	24		01		01			
FO	GM	DV	FO	06	D	74007	30	1	1	01		01		01			
FO	GM	DV	FO	07	E	58451	20	1	1	24		24		01			
FO	GM	DV	FO	07	A	119242	25	1	0	01		01		01			
FO	GM	DV	FO	07	B	58922	30	1	0	02	/	01		01			
FO	GM	DV	FO	08	A	37121	45	1	0	01		01		01			

PO	GM	DV	PO	08	E	81547	45	1	0	02/	02/	01		
PO	GM	DV	PO	08	C	143798	00	1	0	24	24	24		
PO	GM	DV	PO	08	D	91334	15	1	0	02/	02/	02/		
PO	GM	DV	PO	08	E	68464	30	1	0	02/	02/	01		
PO	GM	DV	PO	08	F	47863	35	1	0	23	23	02/		
PO	GM	DV	PO	08	G	85314	25	1	1	01	05	$0	05/	$0
PO	GM	DV	PO	09	A	37739	40	1	0	02/	01		02/	
PO	GM	DV	PO	09	B	65303	50	1	0	02/	01		02	
PO	GM	DV	PO	09	C	50484	40	1	0	02/	01		01	
PO	GM	DV	PO	09	D	20800	40	1	0	01	01		01	
PO	GM	DV	PO	09	E	51164	40	1	0	02/	01		01	
PO	GM	DV	PO	09	F	54091	10	1	0	01	01		01	
PO	GM	DV	PO	09	G	79178	-99	1	0	24	$0	08	$0	08 $0
PO	GM	DV	PO	09	H	71594	10	1	0	07	01		01	
PO	GM	DV	PO	10		2601	30	1	1	01	01		01	
PO	GM	DV	PO	11	A	7652	25	1	0	02/	01		01	
PO	GM	DV	PO	11	B	38892	40	1	0	01	01		01	
PO	GM	DV	PO	11	C	32195	85	1	0	01	01		07	
PO	GM	DV	PO	11	D	44806	45	1	0	01	01		01	
O	GM	DV	C	01		21448	30	1	0	01	08		01	
O	GM	DV	C	02	A	18606	40	1	0	02/	01		01	
O	GM	DV	C	02	B	41979	30	1	0	02/	01		01	
O	GM	DV	C	02	C	59286	30	1	0	02/$1	02/$1		02	
O	GM	DV	C	03	A	126892	40	1	0	24	05		02/	
O	GM	DV	C	03	B	255360	40	1	0	05	$1	02	$1	02 $1
O	GM	DV	C	03	C	850811	25	1	0	01	01		01	
O	GM	DV	C	03	D	193061	30	1	0	02/	01		01	
O	GM	DV	C	03	E	220395	20	1	1	02/	01		01	
O	GM	DV	C	03	F	391545	30	1	1	01	01		01	
O	GM	DV	C	04	A	55414	40	1	0	24	24		05	
O	GM	DV	C	04	B	100746	30	1	0	02/	01		01	
O	GM	DV	C	04	C	723502	25	1	0	01	01		01	
O	GM	DV	C	04	D	205990	30	1	1	01	01		01	
O	GM	DV	O	05	A	50331	30	1	1	01	01		01	
C	GM	DV	C	05	B	88721	40	1	1	02/	01		02	
O	GM	DV	C	06	A	27852	40	1	0	01	01		01	
O	GM	DV	C	06	B	114353	40	1	0	05	01		01	
C	GM	DV	C	06	C	101673	30	1	1	02/	01		01	
O	GM	DV	C	07	A	9136	40	1	0	05	01		01	
O	GM	DV	C	07	B	15741	45	1	0	07	07		07	
O	GM	DV	C	07	C	24598	85	1	1	07	07		07	
O	GM	DV	C	07	D	21859	45	1	1	01	01		01	
O	GM	DV	O	07	E	16653	45	1	1	01	01		01	
O	GM	DV	C	07	F	19813	60	1	1	01	01		01	
O	GM	DV	C	08	A	15990	-99	1	0	01	01		01	
O	GM	DV	C	08	B	230197	40	1	0	01	01		01	
O	GM	DV	C	08	C	24184	60	1	0	01	01		01	

B	GM	DV	E	01		21860	30	1	0	22*	0H	01		
B	GM	DV	E	02		24284	40	1	0	02/	01	01		
B	GM	DV	E	03	A	73093	40	1	0	02/	01	01		
B	GM	DV	E	03	B	141946	40	1	0	01	01	01		
B	GM	DV	E	03	C	242324	20	1	0	02/$0	01	01		
B	GM	DV	E	03	D	364927	25	1	0	05 $0	01	02/$0		
B	GM	DV	E	03	E	189583	20	1	1	01	01	01		
B	GM	DV	E	03	F	173708	20	1	1	02/	01	01		
B	GM	DV	E	03	G	126328	40	1	1	01	01	01		
B	GM	DV	E	03	H	79003	20	1	1	02/$1	02/$1	01		
B	GM	DV	E	04	A	50244	60	1	0	05	05	01		
B	GM	DV	E	04	B	102432	60	1	0	01	01	01		
B	GM	DV	E	04	C	618553	30	1	0	01	01	01		
B	GM	DV	E	04	D	425828	30	1	1	01	01	01		
B	GM	DV	E	05	A	34738	50	1	0	01	05	01		
B	GM	DV	E	05	B	148682	40	1	0	05	05	01		
B	GM	DV	E	05	C	157065	50	1	0	05	01	01		
B	GM	DV	E	05	D	150203	50	1	0	24 $0	24 $0	01		
B	GM	DV	E	05	E	99049	60	1	0	01	01	01		
B	GM	DV	E	05	F	145412	60	1	1	01	01	01		
B	GM	DV	E	05	G	103157	35	1	1	02/	01	01		
B	GM	DV	E	06	A	6235	40	1	0	02/	01	01		
B	GM	DV	E	06	B	18310	40	1	0	01	01	01		
B	GM	DV	E	06	C	59478	30	1	0	01	01	01		
B	GM	DV	E	06	D	23644	10	1	0	02/$1	02/$1	02/$1		
B	GM	DV	E	06	E	43538	15	1	1	05 $1	01	02/$1		
B	GM	DV	E	06	F	38650	15	1	1	02/	02/	02/		
B	GM	DV	E	06	G	32262	30	1	1	02/$1	02/$1	02/$1		
B	GM	DV	E	06	H	27493	15	1	1	24	02/	02/		
B	GM	DV	E	06	I	10716	20	1	0	02/	02/	02/		
B	GM	DV	E	07		79302	30	1	0	01	01	01		
B	GM	DV	E	08		44152	15	1	1	02/	02/	01		
B	GM	DV	E	09	A	4968	35	1	0	01	01	01		
B	GM	DV	E	09	B	15950	40	1	0	01	01	01		
B	GM	DV	F	10	A	4956	-99	1	0	05	01	01		
B	GM	DV	E	10	B	20411	40	1	0	01	01	01		
B	GM	DV	E	10	C	21212	70	1	0	01	01	01		
CA	GM	DV	CA	01	A	76314	35	1	0	05	02	01		
CA	GM	DV	CA	01	B	158703	40	1	0	05	01	01		
CA	GM	DV	CA	01	C	200943	40	1	0	02/	02/	02/		
CA	GM	DV	CA	01	D	173569	30	1	0	01	01	01		
CA	GM	DV	CA	01	E	174922	35	1	0	01	01	01		
CA	GM	DV	CA	01	F	122527	30	1	0	05	01	01		
CA	GM	DV	CA	01	G	165868	40	1	1	02/01	01	01		
CA	GM	DV	CA	01	H	126884	60	1	1	01	01	01		
CA	GM	DV	CA	01	I	196992	35	1	1	02/01	01	01		
CA	GM	DV	CA	01	J	56443	45	1	1	05	01	01		
CA	GM	DV	CA	01	K	31805	50	1	0	24 $0	24 $0	24 $0		

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HO	IV	[illegible] 01	126483	45	1	0	21	21	01
MA	IV	MA 01	32477	-99	1	0	22 $1	22 $1	22 $1
MB	IV	MB 01	13900	00	1	0	01	01	01
MB	IV	MB 02	1043	50	1	0	02/$1	24 $0	02/$1
OP	IV	OP 01 A	19318	30	1	0	22*	22*	22*
OP	IV	OP 01 B	47423	30	1	0	22	22	01
OP	IV	OP 01 C	124657	45	1	0	22 $0	04	01
OP	IV	OP 02	56494	90	1	0	05	01	01
OP	IV	OP 03	56983	50	1	0	05/$0	05/$0	08
OP	IV	OP 04	11314	45	1	0	05 $0	22 $0	01
PB	IV	PB 01	6282	90	0	0	05	05	05
PB	IV	PB 02 A	5803	70	0	0	24	05	05
PB	IV	PB 02 B	4998	70	0	0	21	05	01
PB	IV	PB 02 C	6277	70	0	0	05	05	05
TO	IV	TO 01 A	42642	60	1	0	01	01	01
TO	IV	TO 01 B	329852	50	1	0	01	01	01
TO	IV	TO 01 C	83957	40	1	0	01	01	01
TO	IV	TO 02 A	14214	-99	1	0	22*	22*	22*
TO	IV	TO 02 B	109951	-99	1	0	22 $0	22 $0	22 $0
TO	IV	TO 02 C	14663	70	1	0	24 $0	24 $0	05 $0
TO	IV	TO 03 A	21878	70	1	0	01	01	01
TO	IV	TO 03 B	39785	40	1	0	01	01	01
TO	IV	TO 03 C	160260	50	1	0	01	01	01
TO	IV	TO 03 D	103259	40	1	0	01	01	01
TO	IV	TO 03 E	53057	50	1	0	01	01	01
TO	IV	TO 04 A	7292	70	1	0	22*	22*	22*
TO	IV	TO 04 B	28496	50	1	0	22 $0	22 $0	01
TO	IV	TO 05	143825	50	1	0	01	01	01
TO	IV	TO 06 A	14712	70	1	0	24 $0	24 $0	24 $0
TO	IV	TO 06 B	33229	-99	1	0	22 $0	22 $0	22 $0
TO	IV	TO 07 A	32539	60	1	0	01	08	01
TO	IV	TO 07 B	59172	60	1	0	01	01	01
TO	IV	TO 07 C	59242	60	1	0	07	01	07
TO	IV	TO 07 D	39878	70	1	0	02/	01	01
TO	IV	TO 07 E	17045	60	1	0	05	01	01
TO	IV	TO 08	24047	60	1	0	01	01	01
VW	IV	VW 01 A	65392	50	1	0	05	[illegible]	05
VW	IV	VW 01 B	967575	35	0	0	05	05	05
VW	IV	VW 01 C	1446029	45	1	0	01	01	01
VW	IV	VW 01 D	697366	90	0	0	05	05	05
VW	IV	VW 02 A	11930	-99	1	0	22*	22*	22*
VW	IV	VW 02 B	29920	-99	1	0	22 $0	22 $0	22 $0
VW	IV	VW 02 C	90896	70	1	0	01	01	01
VW	IV	VW 02 D	61134	-99	0	0	05 $0	05 $0	05 $0
VW	IV	VW 02 E	60796	45	0	0	05	05	05
VW	IV	VW 03 A	48785	45	1	0	05	01	05
VW	IV	VW 03 B	86431	60	1	0	07	01	01
VW	IV	VW 03 C	82111	60	1	0	05	01	01
VW	IV	VW 03 D	38054	90	0	0	05	05	05
VW	IV	VW 04 A	85614	40	0	0	05	05	05
VW	IV	VW 04 B	24124	45	1	0	01	01	01
VW	IV	VW 05	58226	30	1	0	01	01	01
VW	IV	VW 06 A	22106	30	1	0	01	01	01
VW	IV	VW 06 B	37233	15	1	0	24	01	01
VW	IV	VW 07	9030	30	1	0	01	01	01

APPENDIX C. COMPUTER PRINTOUT OF VEHICLE/NOZZLE DATA BY SEARCH CATEGORY

VEHICLE/VAPOR RECOVERY NOZZLE INTERFACE

LIGHT DUTY VEHICLES 1975 TO 1983

ALL VEHICLE NUMBERS ARE ATTRITION-WEIGHTED TO REPRESENT ON-THE-ROAD VEHICLES

SEARCH CATEGORY 1

NOZZLE A, VERTICAL LATCH, FIT CODES 1,2, OR 3

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	37947201	59.9 %	70.3 %
IMPORT	LDV	4027593	51.6 %	68.7 %
DOMESTIC	LDV	33919608	61.1 %	70.6 %
GM	LDV	14657659	52.0 %	69.0 %
FORD	LDV	12867827	75.9 %	78.0 %
CHRYSLER	LDV	5725223	60.0 %	74.8 %

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SEARCH CATEGORY 3

NOZZLE A, ANY LATCH POSITION, FIT CODES 1,2,2*,3, OR 3*

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	47928302	75.6 %	70.3 %
IMPORT	LDV	4068514	52.2 %	68.7 %
DOMESTIC	LDV	43859788	78.9 %	70.6 %
GM	LDV	20154701	71.4 %	69.0 %
FORD	LDV	15467352	91.2 %	78.0 %
CHRYSLER	LDV	7560832	79.2 %	74.8 %

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SEARCH CATEGORY 5

NOZZLE A, ANY LATCH POSITION OR HAND-HOLD
FIT CODES 1,2,2',3,3',4,4',5, OR 5'

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	57368391	90.5 %	70.3 %
IMPORT	LDV	6626721	85.0 %	68.7 %
DOMESTIC	LDV	50741670	91.3 %	70.6 %
GM	LDV	24544298	87.0 %	69.0 %
FORD	LDV	16589923	97.9 %	78.0 %
CHRYSLER	LDV	8930546	93.6 %	74.8 %

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SEARCH CATEGORY 7

NOZZLE B, VERTICAL LATCH, FIT CODES 1,2, OR 3
AND FILL PIPE ANGLE LESS THAN 30 DEGREES

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	21469630	33.9 %	70.3 %
IMPORT	LDV	256324	3.3 %	68.7 %
DOMESTIC	LDV	21213306	38.2 %	70.6 %
GM	LDV	7578902	26.9 %	69.0 %
FORD	LDV	8292533	48.9 %	78.0 %
CHRYSLER	LDV	5010120	52.5 %	74.8 %

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SEARCH CATEGORY 9

NOZZLE B, ANY LATCH POSITION, FIT CODES 1,2,2',3, OR 3' AND FILL PIPE ANGLE LESS THAN 30 DEGREES

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	24190734	38.2 %	70.3 %
IMPORT	LDV	256324	3.3 %	68.7 %
DOMESTIC	LDV	23934410	43.1 %	70.6 %
GM	LDV	8352417	29.6 %	69.0 %
FORD	LDV	9502229	56.1 %	78.0 %
CHRYSLER	LDV	5740009	60.2 %	74.8 %

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SEARCH CATEGORY 11

NOZZLE C, VERTICAL LATCH, FIT CODES 1,2, OR 3

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	52478599	82.8 %	70.3 %
IMPORT	LDV	4736164	60.7 %	68.7 %
DOMESTIC	LDV	47742435	85.9 %	70.6 %
GM	LDV	22326269	79.1 %	69.0 %
FORD	LDV	15764667	93.0 %	78.0 %
CHRYSLER	LDV	8754601	91.8 %	74.8 %

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SEARCH CATEGORY 13

NOZZLE C, ANY LATCH POSITION, FIT CODES 1,2,2',3, OR 3'

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	57648962	91.0 %	70.3 %
IMPORT	LDV	4737207	60.7 %	68.7 %
DOMESTIC	LDV	52911755	95.2 %	70.6 %
GM	LDV	25770393	91.3 %	69.0 %
FORD	LDV	16950983	100.0 %	78.0 %
CHRYSLER	LDV	9285477	97.3 %	74.8 %

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SEARCH CATEGORY 15

NOZZLE C, ANY LATCH POSITION OR HAND-HOLD
FIT CODES 1,2,2',3,3',4,4',5, OR 5'

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FAIL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	60901862	96.1 %	70.3 %
IMPORT	LDV	7051971	90.4 %	68.7 %
DOMESTIC	LDV	53849891	96.9 %	70.6 %
GM	LDV	26464067	93.8 %	69.0 %
FORD	LDV	16950983	100.0 %	78.0 %
CHRYSLER	LDV	9529939	99.9 %	74.8 %

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SEARCH CATEGORY 17

NOZZLE A, MINOR ACCESS, FIT CODE 23

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	567586	0.9 %	70.3 %
IMPORT	LDV	0	0.0 %	68.7 %
DOMESTIC	LDV	567586	1.0 %	70.6 %
GM	LDV	323745	1.1 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	243841	2.6 %	74.8 %

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SEARCH CATEGORY 19

NOZZLE A, PIPE TOO LARGE, FIT CODES 6,9,12,15, OR 18

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	635338	1.0 %	70.3 %
IMPORT	LDV	207191	2.7 %	68.7 %
DOMESTIC	LDV	428147	0.8 %	70.6 %
GM	LDV	428147	1.5 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 21

NOZZLE A, FILL-CAP RETAINER MECHANISM PREVENTS SEAL
FIT CODES 7',10',13',16', OR 19'

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	270650	0.4 %	70.3 %
IMPORT	LDV	0	0.0 %	68.7 %
DOMESTIC	LDV	270650	0.5 %	70.6 %
GM	LDV	0	0.0 %	69.0 %
FORD	LDV	241168	1.4 %	78.0 %
CHRYSLER	LDV	29482	0.3 %	74.8 %

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SEARCH CATEGORY 23

NOZZLE A, SEAL DOES NOT TOUCH PIPE IN ONE REGION
FIT CODES 8,11,14,17, OR 20

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	0	0.0 %	70.3 %
IMPORT	LDV	0	0.0 %	68.7 %
DOMESTIC	LDV	0	0.0 %	70.6 %
GM	LDV	0	0.0 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 25

NOZZLE C, MAJOR ACCESS, FIT CODE 24

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	1339698	2.1 %	70.3 %
IMPORT	LDV	50452	0.6 %	68.7 %
DOMESTIC	LDV	1289246	2.3 %	70.6 %
GM	LDV	1289246	4.6 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 27

NOZZLE C, SHARP BEND, FIT CODE 22

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	288894	0.5 %	70.3 %
IMPORT	LDV	251457	3.2 %	68.7 %
DOMESTIC	LDV	37437	0.1 %	70.6 %
GM	LDV	0	0.0 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	37437	0.4 %	74.8 %

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SEARCH CATEGORY 29

NOZZLE C, PIPE TOO SMALL, FIT CODE 21

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	0	0.0 %	70.3 %
IMPORT	LDV	0	0.0 %	68.7 %
DOMESTIC	LDV	0	0.0 %	70.6 %
GM	LDV	0	0.0 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 31

NOZZLE C, INTERFERENCE WITH SEAL IN IMMEDIATE VICINITY OF PIPE OPENING
FIT CODES 7,10,13,16, OR 19

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	178454	0.3 %	70.3 %
IMPORT	LDV	59242	0.8 %	68.7 %
DOMESTIC	LDV	119212	0.2 %	70.6 %
GM	LDV	119212	0.4 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 33

NOZZLE C, LEAD RESTRICTOR PREVENTS OR INTERFERES WITH SEAL
ANY FIT CODE WITH ASTERISK

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	63366	0.1 %	70.3 %
IMPORT	LDV	63366	0.8 %	68.7 %
DOMESTIC	LDV	0	0.0 %	70.6 %
GM	LDV	0	0.0 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 35

NOZZLE C, NON-LATCHING, FIT CODES 4,5,18,19,20,21,22,23, OR 24

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	5298359	8.4 %	70.3 %
IMPORT	LDV	2823864	36.2 %	68.7 %
DOMESTIC	LDV	2474495	4.5 %	70.6 %
GM	LDV	2192596	7.8 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	281899	3.0 %	74.8 %

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SEARCH CATEGORY 37

LATCH NOT POSSIBLE, FILL PIPES WITH NO INNER LIP

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	2399271	3.8 %	70.3 %
IMPORT	LDV	2190922	28.1 %	68.7 %
DOMESTIC	LDV	208349	0.4 %	70.6 %
GM	LDV	208349	0.7 %	69.0 %
FORD	LDV	0	0.0 %	78.0 %
CHRYSLER	LDV	0	0.0 %	74.8 %

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SEARCH CATEGORY 39

FILL-CAP NOT VENTED AND PRE-1970

HIERARCHY		VEHICLES IN SEARCH CATEGORY	PERCENTAGE OF VEHICLES COVERED BY THIS SURVEY WHICH FALL IN SEARCH CATEGORY	VEHICLES COVERED BY THIS SURVEY / TOTAL VEHICLE POPULATION
TOTAL	LDV	11812663	18.6 %	70.3 %
IMPORT	LDV	0	0.0 %	68.7 %
DOMESTIC	LDV	11812663	21.3 %	70.6 %
GM	LDV	8209293	29.1 %	69.0 %
FORD	LDV	919900	5.4 %	78.0 %
CHRYSLER	LDV	2652136	27.8 %	74.8 %

APPENDIX D

VEHICLE BLOCKS IN EACH SEARCH CATEGORY

LEGEND

This appendix presents the search categories in the same order as they are given in Appendix C. For example, the first search category consists of all those vehicles for which Nozzle A showed a vertical latch fit code of 1, 2, or 3. The first listing of this appendix therefore lists all the vehicle blocks which fall in this search category. Specific makes and model years are identified by the use of Appendix A. Thus, the first entry in Search Category 1 is the vehicle block P 01 A, which is seen from Appendix A to consist of the 1975 Plymouth Valiant and Duster.

As a further example of the use of Appendices A, B, C and D, assume that it is of interest to identify the specific type and number of domestic LDV for which Nozzle C will not latch and seal due to a sharp bend in the fillpipe. This represents Search Category 27, for which Appendix C shows a total of 288,894 in-use vehicles, of which only 37,437 (or 0.4% of the vehicles covered by this survey) are domestic LDV, and all of these are Chrysler Corporation products. Referring to Search Category 27 of this appendix, it is seen that the only vehicle block concerned for domestic LDV is P 04 B. Reference to Appendix A shows that this vehicle block is comprised of the 1970 Plymouth Barracuda.

For this example, there was only one vehicle block in the category of interest, so that the vehicle number (37,437) given in the printout of Appendix C of course applies only to that vehicle block. Had there been two or more vehicle blocks concerned, the number of vehicles in each would be determined from the vehicle block data summary of Appendix B.

The following tabulation will help to facilitate cross-reference with Appendix A.

VEHICLE MAKE	FIRST LETTER OF VEHICLE BLOCK DESIGNATION
Domestic LDV	
General Motors	
Chevrolet	C
Pontiac	PO
Oldsmobile	O
Buick	B
Cadillac	CA
Ford Motor Company	
Ford	F
Mercury	M
Lincoln	L
Chrysler Corporation	
Plymouth	P
Dodge	D
Chrysler	CH
Imperial	I
Other Domestics	
American Motors	AM
Studebaker	ST
Import LDV	
Audi	AU
Capri	CP
Colt	CL
Datsun	DA
Fiat	FI
English Ford	EF
Honda	HO
Mazda	MA
Mercedes-Benz	MB
Opel	OP
Porsche	PR
Toyota	TO
Volkswagen	VW

SEARCH CATEGORY 1

NOZZLE A, VERTICAL LATCH, FIT CODES 1, 2, OR 3

P 01 A
P 01 B
P 01 C
P 02 A
P 02 D
P 02 G
P 02 K
P 03 A
P 03 B
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 04 D
P 05 C
D 01 A
D 01 B
D 01 C
D 02 A
D 02 B
D 03 A
D 03 H
D 03 I
D 04 A
D 04 B
D 04 D
D 04 E
CH 01
CH 02 E
CH 04 A
I 01 B
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 G
F 04 B
F 07 C
F 07 E
F 08 A
F 08 B
F 08 D
F 08 E
F 08 F
F 08 G
F 09 A
F 09 B
F 09 C
F 09 E
F 10 A
F 11 A
F 11 B
F 12 A
F 12 B
M 02 A
M 02 C
M 02 D
M 03 A
M 03 B
M 03 C
M 03 D
M 03 E
M 06
M 07 A
M 07 B
M 07 D
M 07 E
L 01 A
L 01 B
L 01 D
L 02 A
L 02 C
L 02 D
C 01
C 02 D
C 03 C
C 04 D
C 05 A
C 05 B
C 05 C
C 05 D
C 06 A
C 06 D
C 06 F
C 07 D
C 08 E
C 08 G
C 08 I
C 08 J
C 09 F
C 10 E
C 10 F
C 12
C 13
C 15 A
C 15 B
C 15 C
P¢ 02 D
P¢ 03 C
P¢ 03 D
P¢ 04 A
P¢ 04 B
P¢ 04 C
P¢ 05 A
P¢ 06 A
P¢ 06 B
P¢ 06 D
P¢ 07 A
P¢ 08 A
P¢ 08 G
P¢ 09 D
P¢ 09 F
P¢ 12
P¢ 11 B
P¢ 11 C
P¢ 11 D
¢ 01
¢ 03 C
¢ 03 F
¢ 04 C
¢ 04 D
¢ 05 A
¢ 07 D
¢ 07 E
¢ 08 A
¢ 08 B
¢ 08 C
B 03 B
B 03 E
B 03 G
B 04 A
B 04 C
B 04 D
B 05 A
B 05 E

SEARCH CATEGORY 1, (CONT'D)

NOZZLE A, VERTICAL LATCH, FIT CODES 1, 2, OR 3

B 05 F
B 06 B
B 06 C
B 07
B 08
B 09 A
B 09 B
B 10 B
B 10 C
CA 01 D
CA 01 E
CA 01 H
CA 02 C
CA 02 F
CA 03 B
AH 01
AM 02 A
AM 02 B
AM 02 C
AM 03 A
AM 03 B
AM 04 A
AM 04 C
AM 05 A
AM 06
AM 07 B
AN 08
AU 01 A
AU 01 B
CP 01 B
CL 01
DA 01 A
DA 01 B
DA 01 C
DA 02 A
DA 02 B
DA 04 A
DA 05
EF 01
NB 01
TΦ 01 A
TΦ 01 B
TΦ 01 C
TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E
TΦ 05
TΦ 07 A
TΦ 07 B
TΦ 08
VW 01 C
VW 02 C
VW 04 B
VW 05
VW 06 A
VW 07

SEARCH CATEGORY 2

NOZZLE A, VERTICAL LATCH, FIT CODES 1, 2, OR 3
AND FILL PIPE ANGLE LESS THAN 30 DEGREES

P	01	A
P	01	B
P	01	C
P	02	D
P	02	K
P	03	D
P	03	E
P	03	H
D	01	A
D	01	B
D	01	C
D	02	B
D	04	E
I	01	B
F	01	A
F	01	B
F	02	A
F	02	B
F	03	A
F	03	B
F	03	C
F	03	D
F	03	G
F	04	B
F	07	C
F	07	E
F	08	A
F	08	B
F	08	D
F	11	A
M	02	A
M	02	C
M	03	A
M	06	

L	01	A
L	01	D
L	02	A
C	02	D
C	03	C
C	05	C
C	05	D
C	06	D
C	06	F
C	10	F
C	13	F
PΦ	03	C
PΦ	04	B
PΦ	05	A
PΦ	07	A
PΦ	08	G
PΦ	09	F
Φ	03	C
Φ	04	C
B	03	E
AM	02	A
AM	02	B
AM	03	A
AM	04	C
AM	05	A
AM	07	B
DA	04	A
EF	01	
MB	01	

SEARCH CATEGORY 3

NOZZLE A, ANY LATCH POSITION, FIT CODES 1,2,2',3 OR 3'

P 01 A
P 01 B
P 01 C
P 02 A
P 02 B
P 02 C
P 02 D
P 02 G
P 02 J
P 02 K
P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 I
P 03 J
P 04 D
P 05 C
D 01 A
D 01 B
D 01 C
D 02 A
D 02 B
D 03 A
D 03 B
D 03 F
D 03 H
D 03 I
D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G

CH 01
CH 02 A
CH 02 B
CH 02 C
CH 02 D
CH 02 E
CH 03 B
CH 03 C
CH 03 D
CH 04 A
I 01 A
I 01 B
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 F
F 03 G
F 04 A
F 04 B
F 05
F 06
F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C

F 08 D
F 08 E
F 08 F
F 08 G
F 09 A
F 09 B
F 09 C
F 09 E
F 10 A
F 11 A
F 11 B
F 11 C
F 12 A
F 12 B
M 01 A
M 01 C
M 01 D
M 02 A
M 02 B
M 02 C
M 02 D
M 03 A
M 03 B
M 03 C
M 03 D
M 03 E
M 04 A
M 04 B
M 04 C
M 04 D
M 05
M 06
M 07 A
M 07 B
M 07 D
M 07 E

L 01 A
L 01 B
L 01 D
L 02 A
L 02 B
L 02 C
L 02 D
C 01
C 02 C
C 02 D
C 03 C
C 04 C
C 04 D
C 04 E
C 05 A
C 05 B
C 05 C
C 05 D
C 05 G
C 06 A
C 06 B
C 06 D
C 06 E
C 06 F
C 07 C
C 07 D
C 08 B
C 08 E
C 08 G
C 08 I
C 08 J
C 09 D
C 09 F
C 10 B
C 10 C
C 10 E
C 10 F

SEARCH CATEGORY 3 (CONT'D)

NOZZLE A, ANY LATCH POSITION, FIT CODES 1, 2, 2', 3 OR 3'

C 12
C 13
C 15 A
C 15 B
C 15 C
PΦ 02 A
PΦ 02 B
PΦ 02 C
PΦ 02 D
PΦ 03 B
PΦ 03 C
PΦ 03 D
PΦ 04 A
PΦ 04 B
PΦ 04 C
PΦ 05 A
PΦ 05 B
PΦ 06 A
PΦ 06 B
PΦ 06 D
PΦ 07 A
PΦ 07 B
PΦ 08 A
PΦ 08 B
PΦ 08 D
PΦ 08 E
PΦ 08 G
PΦ 09 A
PΦ 09 B
PΦ 09 C
PΦ 09 D
PΦ 09 E
PΦ 09 F
PΦ 10
PΦ 11 A
PΦ 11 B
PΦ 11 C
PΦ 11 D
Φ 01
Φ 02 A
Φ 02 B
Φ 02 C
Φ 03 C
Φ 03 D
Φ 03 E
Φ 03 F
Φ 04 B
Φ 04 C
Φ 04 D
Φ 05 A
Φ 05 B
Φ 06 C
Φ 07 D
Φ 07 E
Φ 08 A
Φ 08 B
Φ 08 C
B 02
B 03 A
B 03 B
B 03 C
B 03 E
B 03 F
B 03 G
B 03 H
B 04 B
B 04 C
B 04 D
B 05 A
B 05 E
B 05 F
B 05 G
B 06 A
B 06 B
B 06 C
B 06 D
B 06 F
B 06 G
B 06 I
B 07
B 08
B 09 A
B 09 B
B 10 B
B 10 C
CA 01 C
CA 01 D
CA 01 E
CA 01 G
CA 01 H
CA 01 I
CA 02 A
CA 02 C
CA 02 F
CA 03 A
CA 03 B
CA 03 C
AM 01
AM 02 A
AM 02 B
AM 02 C
AM 03 A
AM 03 B
AM 04 A
AM 04 C
AM 05 A
AM 06
AM 07 B
AM 08
ST 01
AU 01 A
AU 01 B
CP 01 B
CL 01
DA 01 A
DA 01 B
DA 01 C
DA 02 A
DA 02 B
DA 04 A
DA 05
EF 01
MB 01
MB 02
TΦ 01 A
TΦ 01 B
TΦ 01 C
TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E
TΦ 05
TΦ 07 A
TΦ 07 B
TΦ 07 D
TΦ 08
VW 01 C
VW 02 C
VW 04 B
VW 05
VW 06 A
VW 07

SEARCH CATEGORY 4

NOZZLE A, ANY LATCH POSITION, FIT CODES 1,2,2',3 OR 3' AND FILL PIPE ANGLE LESS THAN 30 DEGREES

P	01	A
P	01	B
P	01	C
P	02	B
P	02	C
P	02	D
P	02	K
P	03	C
P	03	D
P	03	E
P	03	H
P	03	I
D	01	A
D	01	B
D	01	C
D	02	B
D	03	F
D	04	E
D	04	G
CH	02	D
CH	03	B
CH	03	C
CH	03	D
I	01	A
I	01	B
F	01	A
F	01	B
F	02	A
F	02	B
F	03	A
F	03	B
F	03	C
F	03	D
F	03	F
F	03	G
F	04	A
F	04	B
F	05	
F	07	A
F	07	B
F	07	C
F	07	D
F	07	E
F	07	F
F	07	G
F	07	H
F	08	A
F	08	B
F	08	C
F	08	D
F	11	A
F	11	C
M	01	A
M	01	D
M	02	A
M	02	C
M	03	A
M	04	A
M	04	E
M	05	
M	08	
L	01	A
L	01	D
L	02	A
L	02	B
C	02	D
C	03	C
C	04	E
C	05	C
C	05	D
C	06	D
C	06	E
C	06	F
C	10	F
C	13	
PΦ	03	C
PΦ	04	B
PΦ	05	A
PΦ	07	A
PΦ	08	D
PΦ	08	G
PΦ	09	F
PΦ	11	A
Φ	03	C
Φ	04	C
B	03	C
B	03	E
B	03	F
B	03	H
B	06	D
B	06	F
B	06	I
AM	02	A
AM	02	B
AM	03	A
AM	04	C
AM	05	A
AM	07	B
ST	01	
DA	04	A
EF	01	
MB	01	

SEARCH CATEGORY 5

NOZZLE A, ANY LATCH POSITION OR HAND-HOLD
FIT CODES 1, 2, 2', 3, 3', 4, 4', 5, OR 5'

P 01 A
P 01 B
P 01 C

P 02 A
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 G
P 02 H
P 02 I
P 02 J
P 02 K

P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 I
P 03 J

P 04 D

P 05 C

P 06 A
P 06 B

D 01 A
D 01 B
D 01 C

D 02 A
D 02 B

D 03 A
D 03 B
D 03 C
D 03 E
D 03 F

D 03 G
D 03 H
D 03 I

D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G

D 05 A
D 05 B

D 06

CH 01
CH 02 A
CH 02 B
CH 02 C
CH 02 D
CH 02 E
CH 02 F

CH 03 A
CH 03 B
CH 03 C
CH 03 D

CH 04 A
CH 04 B

I 01 A
I 01 B

F 01 A
F 01 B

F 02 A
F 02 B

F 03 A
F 03 B
F 03 C
F 03 D
F 03 F
F 03 G

F 04 A
F 04 B

F 05

F 06

F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H

F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G

F 09 A
F 09 B
F 09 C
F 09 D
F 09 E

F 10 A
F 10 B
F 10 C
F 10 D

F 11 A
F 11 B
F 11 C

F 12 A
F 12 B

M 01 A
M 01 B
M 01 C
M 01 D
M 01 E

M 01 F

M 02 A
M 02 B
M 02 C
M 02 D

M 03 A
M 03 B
M 03 C
M 03 D
M 03 E

M 04 A
M 04 B
M 04 C
M 04 D

M 05

M 06

M 07 A
M 07 B
M 07 C
M 07 D
M 07 E

L 01 A
L 01 B
L 01 C
L 01 D

L 02 A
L 02 B
L 02 C
L 02 D

C 01

C 02 C
C 02 D

C 03 B
C 03 C

C 04 A
C 04 C
C 04 D

SEARCH CATEGORY 5 (CONT'D)

C 04 E
C 05 A
C 05 B
C 05 C
C 05 D
C 05 F
C 05 G
C 06 A
C 06 B
C 06 D
C 06 E
C 06 F
C 07 A
C 07 B
C 07 C
C 07 D
C 08 B
C 08 C
C 08 D
C 08 E
C 08 G
C 08 H
C 08 I
C 08 J
C 09 D
C 09 E
C 09 F
C 10 A
C 10 B
C 10 C
C 10 D
C 10 E
C 10 F
C 11 A
C 11 B
C 12
C 13
C 15 A
C 15 B
C 15 C
PØ 02 A
PØ 02 B
PØ 02 C
PØ 02 D
PØ 03 B
PØ 03 C
PØ 03 D
PØ 04 A
PØ 04 B
PØ 04 C
PØ 04 D
PØ 05 A
PØ 05 B
PØ 06 A
PØ 06 B
PØ 06 D
PØ 07 A
PØ 07 B
PØ 08 A
PØ 08 B
PØ 08 D
PØ 08 E
PØ 08 G
PØ 09 A
PØ 09 B
PØ 09 C
PØ 09 D
PØ 09 E
PØ 09 F
PØ 10
PØ 11 A
PØ 11 B
PØ 11 C
PØ 11 D
Ø 01
Ø 02 A
Ø 02 B
Ø 02 C
Ø 03 B
Ø 03 C
Ø 03 D
Ø 03 E
Ø 03 F
Ø 04 B
Ø 04 C
Ø 04 D
Ø 05 A
Ø 05 B
Ø 06 A
Ø 06 B
Ø 06 C
Ø 07 A
Ø 07 D
Ø 07 E
Ø 07 F
Ø 08 A
Ø 08 B
Ø 08 C
B 02
B 03 A
B 03 B
B 03 C
B 03 D
B 03 E
B 03 F
B 04 A
B 04 B
B 04 C
B 04 D
B 05 A
B 05 B
B 05 C
B 05 E
B 05 F
B 05 G
B 06 A
B 06 B
B 06 C
B 06 D
B 06 E
B 06 F
B 06 G
B 06 I
B 07
B 08
B 09 A
B 09 B
B 10 A
B 10 B
B 10 C
CA 01 A
CA 01 B
CA 01 C
CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J
CA 02 A
CA 02 B
CA 02 C
CA 02 E
CA 02 F
CA 03 A
CA 03 B
CA 03 C
AM 01

SEARCH CATEGORY 5 (CONT'D)

AM 02 A
AM 02 B
AM 02 C

AM 03 A
AM 03 B

AM 04 A
AM 04 C

AM 05 A

AM 06

AM 07 B

AM 08

ST 01

AU 01 A
AU 01 B

CL 01

DA 01 A
DA 01 B
DA 01 C

DA 02 A
DA 02 B

DA 04 A

DA 05

FI 01

ET 01

MB 01

MB 02

ΦP 02
ΦP 03
ΦP 04

PR 01

PR 02 C

TΦ 01 A
TΦ 01 B
TΦ 01 C

TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E

TΦ 05

TΦ 07 A
TΦ 07 B
TΦ 07 D
TΦ 07 E

TΦ 08

VW 01 A
VW 01 B
VW 01 C
VW 01 D

VW 02 C
VW 02 D
VW 02 E

VW 03 A
VW 03 C
VW 03 D

VW 04 A
VW 04 B

VW 05

VW 06 A

VW 07

SEARCH CATEGORY 6

NOZZLE B, VERTICAL LATCH, FIT CODES 1, 2, OR 3

P 01 A
P 01 B
P 01 C
P 02 A
P 02 B
P 02 C
P 02 D
P 02 F
P 02 G
P 02 I
P 02 J
P 02 K
P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 04 C
P 04 D
P 05 A

D 01 A
D 01 B
D 01 C
D 01 D
D 02 A
D 02 B
D 03 A
D 03 B
D 03 C
D 03 D
D 03 E
D 03 H
D 03 I
D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 G

CH 01
CH 02 A
CH 02 B
CH 02 C
CH 02 E
CH 02 F
CH 03 A
CH 03 B
CH 03 C
CH 03 D

I 01 A
I 01 B
I 01 C

F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 F
F 03 G
F 04 B
F 05
F 07 C
F 07 D
F 07 E
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G
F 09 A
F 09 B
F 09 C
F 09 D
F 09 E
F 10 A
F 10 D
F 11 A
F 11 B
F 11 C
F 12 A
F 12 B

M 01 E
M 02 A
M 02 B
M 02 C
M 02 D
M 03 A
M 03 B
M 03 C
M 03 D
M 03 E
M 04 A
M 04 B
M 04 C
N 04 D
M 05
M 06
M 07 A
M 07 B
M 07 C
M 07 D
M 07 E

L 01 A
L 01 B
L 01 C
L 01 D
L 02 A
L 02 B
L 02 C
L 02 D

C 01
C 02 A
C 02 B
C 02 D
C 03 C
C 04 A
C 04 D
C 04 E
C 05 A
C 05 B
C 05 C
C 05 D
C 05 F
C 05 G
C 06 A
C 06 B
C 06 D
C 06 F
C 07 A
C 07 C
C 07 D
C 08 A
C 08 C
C 08 E
C 08 G
C 08 I
C 08 J
C 09 A
C 09 B

SEARCH CATEGORY 6. (CONT'D)

C 09 E
C 09 F
C 10 B
C 10 D
C 10 F
C 12
C 13
C 14
C 15 A
C 15 B
C 15 C
PΦ 01
PΦ 02 A
PΦ 02 B
PΦ 02 D
PΦ 03 B
PΦ 03 C
PΦ 03 D
PΦ 04 A
PΦ 04 B
PΦ 04 C
PΦ 04 D
PΦ 05 A
PΦ 05 B
PΦ 06 A
PΦ 06 B
PΦ 06 C
PΦ 06 D
PΦ 07 A
PΦ 07 B
PΦ 08 A
PΦ 09 A
PΦ 09 B
PΦ 09 C
PΦ 09 D

PΦ 09 E
PΦ 09 F
PΦ 09 H
PΦ 10
PΦ 11 A
PΦ 11 B
PΦ 11 C
PΦ 11 D
Φ 02 A
Φ 02 B
Φ 03 B
Φ 03 C
Φ 03 D
Φ 03 E
Φ 03 F
Φ 04 B
Φ 04 C
Φ 04 D
Φ 05 A
Φ 05 B
Φ 06 A
Φ 06 B
Φ 06 C
Φ 07 A
Φ 07 D
Φ 07 E
Φ 07 F
Φ 08 A
Φ 08 B
Φ 08 C
B 02
B 03 A
B 03 B
B 03 C
B 03 D
B 03 E
B 03 F

B 03 G
B 04 B
B 04 C
B 04 D
B 05 C
B 05 E
B 05 F
B 05 G
B 06 A
B 06 B
B 06 C
B 06 E
B 07
B 09 A
B 09 B
B 10 A
B 10 B
B 10 C
CA 01 A
CA 01 B
CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J
CA 02 A
CA 02 C
CA 02 F
CA 03 A
CA 03 B
CA 03 C
AM 01
AM 02 A
AM 02 B
AM 02 C

AM 03 A
AM 03 B
AM 04 A
AM 05 A
AM 05 B
AM 06
AM 07 B
AM 08
AU 01 A
AU 01 B
CP 01 B
CL 01
DA 01 A
DA 01 C
DA 02 A
DA 02 B
DA 04 A
DA 05
EF 01
MB 01
ΦP 02
TΦ 01 A
TΦ 01 B
TΦ 01 C
TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E
TΦ 05
TΦ 07 B
TΦ 07 C
TΦ 07 D

SEARCH CATEGORY 6, (CONT'D)

TΦ	07	E
TΦ	08	
VW	01	A
VW	01	C
VW	02	C
VW	03	A
VW	03	B
VW	03	C
VW	04	B
VW	05	
VW	06	A
VW	06	B
VW	07	

SEARCH CATEGORY 7

NOZZLE B, VERTICAL LATCH, FIT CODES 1, 2, OR 3 AND FILL PIPE ANGLE LESS THAN 30 DEGREES

P	01	A
P	01	B
P	01	C
P	02	B
P	02	C
P	02	D
P	02	F
P	02	K
P	03	C
P	03	D
P	03	E
P	03	H
P	04	C
P	05	A
D	01	A
D	01	B
D	01	C
D	01	D
D	02	B
D	04	E
D	04	G
CH	02	F
CH	03	B
CH	03	C
CH	03	D
I	01	A
I	01	B
F	01	A
F	01	B
F	02	A
F	02	B
F	03	A
F	03	B
F	03	C
F	03	D
F	03	F
F	03	G
F	04	B
F	05	
F	07	C
F	07	D
F	07	E
F	07	G
F	07	H
F	08	A
F	08	B
F	08	C
F	08	D
F	11	A
F	11	C
M	01	E
M	02	A
M	02	C
M	03	A
M	04	A
M	04	B
M	05	
M	06	
L	01	A
L	01	C
L	01	D
L	02	A
L	02	B
C	02	D
C	03	C
C	04	E
C	05	C
C	05	D
C	06	D
C	06	F
C	10	F
C	13	
C	14	
PΦ	01	
PΦ	03	C
PΦ	04	B
PΦ	04	D
PΦ	05	A
PΦ	07	A
PΦ	09	F
PΦ	09	H
PΦ	11	A
Φ	03	C
Φ	03	E
Φ	04	C
B	03	C
B	03	D
B	03	E
B	03	F
B	06	E
AM	02	A
AM	02	B
AM	03	A
AM	05	A
AM	05	B
AM	07	B
DA	04	A
EF	01	
MB	01	
VW	06	B

SEARCH CATEGORY 8

NOZZLE B, ANY LATCH POSITION, FIT CODES 1, 2, 2', 3 OR 3'

P 01 A
P 01 B
P 01 C

P 02 A
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 G
P 02 H
P 02 I
P 02 J
P 02 K

P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 I
P 03 J

P 04 C
P 04 D

P 05 A
P 05 C

D 01 A
D 01 B
D 01 C
D 01 D

D 02 A
D 02 B

D 03 A
D 03 B
D 03 C
D 03 D
D 03 E
D 03 F
D 03 G
D 03 H
D 03 I

D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G

CH 01

CH 02 A
CH 02 B
CH 02 C
CH 02 D
CH 02 E
CH 02 F

CH 03 A
CH 03 B
CH 03 C
CH 03 D

I 01 A
I 01 B
I 01 C

F 01 A
F 01 B

F 02 A
F 02 B

F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G

F 04 A
F 04 B

F 05

F 06

F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H

F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G

F 09 A
F 09 B
F 09 C
F 09 D
F 09 E

F 10 A
F 10 B
F 10 D

F 11 A
F 11 B
F 11 C

F 12 A
F 12 B

M 01 A
M 01 B
M 01 C
M 01 D
M 01 E
M 01 F

M 02 A
M 02 B
M 02 C
M 02 D

M 03 A
M 03 B
M 03 C
M 03 D
M 03 E

M 04 A
M 04 B
M 04 C
M 04 D

M 05

M 06

M 07 A
M 07 B
M 07 C
M 07 D
M 07 E

L 01 A
L 01 B
L 01 C
L 01 D

L 02 A
L 02 B
L 02 C
L 02 D

C 01

C 02 A
C 02 B
C 02 C
C 02 D

C 03 C

C 04 A
C 04 B

SEARCH CATEGORY 8. (CONT'D)

C 04 C
C 04 D
C 04 E

C 05 A
C 05 B
C 05 C
C 05 D
C 05 F
C 05 G

C 06 A
C 06 B
C 06 D
C 06 E
C 06 F

C 07 A
C 07 B
C 07 C
C 07 D

C 08 A
C 08 C
C 08 E
C 08 G
C 08 I
C 08 J

C 09 A
C 09 B
C 09 C
C 09 D
C 09 E
C 09 F

C 10 B
C 10 C
C 10 D
C 10 F

C 12

C 13

C 14

C 15 A
C 15 B
C 15 C

Pϕ 01

Pϕ 02 A
Pϕ 02 B
Pϕ 02 C
Pϕ 02 D

Pϕ 03 B
Pϕ 03 C
Pϕ 03 D

Pϕ 04 A
Pϕ 04 B
Pϕ 04 C
Pϕ 04 D

Pϕ 05 A
Pϕ 05 B

Pϕ 06 A
Pϕ 06 B
Pϕ 06 C
Pϕ 06 D

Pϕ 07 A
Pϕ 07 B

Pϕ 08 A
Pϕ 08 B
Pϕ 08 D
Pϕ 08 E

Pϕ 09 A
Pϕ 09 B
Pϕ 09 C
Pϕ 09 D
Pϕ 09 E
Pϕ 09 F
Pϕ 09 H

Pϕ 10

Pϕ 11 A
Pϕ 11 B
Pϕ 11 C
Pϕ 11 D

ϕ 02 A
ϕ 02 B
ϕ 02 C

ϕ 03 B
ϕ 03 C
ϕ 03 D
ϕ 03 E
ϕ 03 F

ϕ 04 B
ϕ 04 C
ϕ 04 D

ϕ 05 A
ϕ 05 B

ϕ 06 A
ϕ 06 B
ϕ 06 C

ϕ 07 A
ϕ 07 D
ϕ 07 E
ϕ 07 F

ϕ 08 A
ϕ 08 B
ϕ 08 C

B 02

B 03 A
B 03 B
B 03 C
B 03 D
B 03 E
B 03 F
B 03 G
B 03 H

B 04 B

B 04 C
B 04 D

B 05 C
B 05 E
B 05 F
B 05 G

B 06 A
B 06 B
B 06 C
B 06 D
B 06 E
B 06 F
B 06 G
B 06 H
B 06 I

B 07

B 08

B 09 A
B 09 B

B 10 A
B 10 B
B 10 C

CA 01 A
CA 01 B
CA 01 C
CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J

CA 02 A
CA 02 B
CA 02 C
CA 02 F

SEARCH CATEGORY 8, (CONT'D)

CA 03 A
CA 03 B
CA 03 C

AM 01

AM 02 A
AM 02 B
AM 02 C

AM 03 A
AM 03 B

AM 04 A

AM 05 A
AM 05 B

AM 06

AM 07 B

AM 08

ST 01

AU 01 A
AU 01 B

CP 01 B

CL 01

DA 01 A
DA 01 C

DA 02 A
DA 02 B

DA 04 A

DA 05

EF 01

MB 01

ΦP 02

TΦ 01 A
TΦ 01 B
TΦ 01 C

TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E

TΦ 05

TΦ 07 B
TΦ 07 C
TΦ 07 D
TΦ 07 E

TΦ 08

VW 01 A
VW 01 C

VW 02 C

VW 03 A
VW 03 B
VW 03 C

VW 04 B

VW 05

VW 06 A
VW 06 B

VW 07

SEARCH CATEGORY 9

NOZZLE B, ANY LATCH POSITION, FIT CODES 1, 2, 2', 3 OR 3'
AND FILL PIPE ANGLE LESS THAN 30 DEGREES

P 01 A
P 01 B
P 01 C
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 K
P 03 C
P 03 D
P 03 E
P 03 H
P 03 I
P 04 C
P 05 A
D 01 A
D 01 B
D 01 C
D 01 D
D 02 B
D 03 F
D 03 G
D 04 E
D 04 G
CH 02 D
CH 02 F
CH 03 B
CH 03 C
CH 03 D
I 01 A
I 01 B
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G
F 04 A
F 04 B
F 05
F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 11 A
F 11 C
M 01 A
M 01 B
M 01 D
M 01 E
M 01 F
M 02 A
M 02 C
M 03 A
M 04 A
M 04 B
M 05
M 06
L 01 A
L 01 C
L 01 D
L 02 A
L 02 B
C 02 D
C 03 C
C 04 E
C 05 C
C 05 D
C 06 D
C 06 E
C 06 F
C 09 C
C 10 F
C 13
C 14
PΦ 01
PΦ 03 C
PΦ 04 B
PΦ 04 D
PΦ 05 A
PΦ 07 A
PΦ 08 D
PΦ 09 F
PΦ 09 H
PΦ 11 A
Φ 03 C
Φ 03 E
Φ 04 C
B 03 C
B 03 D
B 03 E
B 03 F
B 03 H
B 06 D
B 06 E
B 06 F
B 06 H
B 06 I
AM 02 A
AM 02 B
AM 03 A
AM 05 A
AM 05 B
AM 07 B
ST 01
DA 04 A
EF 01
MB 01
VW 06 B

SEARCH CATEGORY 10

NOZZLE B, ANY LATCH POSITION OR HAND-HOLD

FIT CODES 1, 2, 2', 3, 3', 4, 4', 5, OR 5'

P 01 A
P 01 B
P 01 C

P 02 A
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 G
P 02 H
P 02 I
P 02 J
P 02 K

P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 I
P 03 J

P 04 C
P 04 D

P 05 A
P 05 B
P 05 C

P 06 A
P 06 B
P 06 C

D 01 A
D 01 B
D 01 C
D 01 D

D 02 A
D 02 B

D 03 A
D 03 B
D 03 C
D 03 D
D 03 E
D 03 F
D 03 G
D 03 H
D 03 I

D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G

D 05 A
D 05 B

D 06

CH 01

CH 02 A
CH 02 B
CH 02 C
CH 02 D
CH 02 E
CH 02 F

CH 03 A
CH 03 B
CH 03 C
CH 03 D

CH 04 B

I 01 A
I 01 B
I 01 C

F 01 A
F 01 B

F 02 A
F 02 B

F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G

F 04 A
F 04 B

F 05

F 06

F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H

F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G

F 09 A
F 09 B
F 09 C
F 09 D
F 09 E

F 10 A
F 10 B
F 10 C
F 10 D

F 11 A
F 11 B
F 11 C

F 12 A
F 12 B

M 01 A
M 01 B
M 01 C
M 01 D
M 01 E
M 01 F

M 02 A
M 02 B
M 02 C
M 02 D

M 03 A
M 03 B
M 03 C
M 03 D
M 03 E

M 04 A
M 04 B
M 04 C
M 04 D

M 05

M 06

M 07 A
M 07 B
M 07 C
M 07 D
M 07 E

L 01 A
L 01 B
L 01 C
L 01 D

L 02 A
L 02 B
L 02 C
L 02 D

C 01

SEARCH CATEGORY 10, (CONT'D)

C 02 A
C 02 B
C 02 C
C 02 D
C 03 C
C 04 A
C 04 B
C 04 C
C 04 D
C 04 E
C 05 A
C 05 B
C 05 C
C 05 D
C 05 F
C 05 G
C 06 A
C 06 B
C 06 D
C 06 E
C 06 F
C 07 A
C 07 B
C 07 C
C 07 D
C 08 A
C 08 B
C 08 C
C 08 D
C 08 E
C 08 G
C 08 I
C 08 J
C 09 A
C 09 B
C 09 C
C 09 D
C 09 E
C 09 F

C 10 A
C 10 B
C 10 C
C 10 D
C 10 F
C 11 A
C 11 B
C 12
C 13
C 14
C 15 A
C 15 B
C 15 C
PΦ 01
PΦ 02 A
PΦ 02 B
PΦ 02 C
PΦ 02 D
PΦ 03 B
PΦ 03 C
PΦ 03 D
PΦ 04 A
PΦ 04 B
PΦ 04 C
PΦ 04 D
PΦ 05 A
PΦ 05 B
PΦ 06 A
PΦ 06 B
PΦ 06 C
PΦ 06 D
PΦ 07 A
PΦ 07 B
PΦ 08 A
PΦ 08 B
PΦ 08 D

PΦ 08 E
PΦ 08 G
PΦ 09 A
PΦ 09 B
PΦ 09 C
PΦ 09 D
PΦ 09 E
PΦ 09 F
PΦ 09 H
PΦ 10
PΦ 11 A
PΦ 11 B
PΦ 11 C
PΦ 11 D
Φ 02 A
Φ 02 B
Φ 02 C
Φ 03 A
Φ 03 B
Φ 03 C
Φ 03 D
Φ 03 E
Φ 03 F
Φ 04 B
Φ 04 C
Φ 04 D
Φ 05 A
Φ 05 B
Φ 06 A
Φ 06 B
Φ 06 C
Φ 07 A
Φ 07 D
Φ 07 E
Φ 07 F
Φ 08 A
Φ 08 B
Φ 08 C

B 02
B 03 A
B 03 B
B 03 C
B 03 D
B 03 E
B 03 F
B 03 G
B 03 H
B 04 A
B 04 B
B 04 C
B 04 D
B 05 A
B 05 B
B 05 C
B 05 E
B 05 F
B 05 G
B 06 A
B 06 B
B 06 C
B 06 D
B 06 E
B 06 F
B 06 G
B 06 H
B 06 I
B 07
B 08
B 09 A
B 09 B
B 10 A
B 10 B
B 10 C

CA 01 A
CA 01 B
CA 01 C

SEARCH CATEGORY 10, (CONT'D)

CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J

CA 02 A
CA 02 B
CA 02 C
CA 02 F

CA 03 A
CA 03 B
CA 03 C
CA 03 D

AM 01

AM 02 A
AM 02 B
AM 02 C

AM 03 A
AM 03 B

AM 04 A

AM 05 A
AM 05 B

AM 06

AM 07 B

AM 08

ST 01

AU 01 A
AU 01 B

CP 01 A
CP 01 B

CL 01

DA 01 A
DA 01 C

DA 02 A
DA 02 B

DA 04 A

DA 05

FI 01

EF 01

MB 01

ΦP 02

ΦP 03

PR 01

PR 02 A
PR 02 B
PR 02 C

TΦ 01 A
TΦ 01 B
TΦ 01 C

TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E

TΦ 05

TΦ 07 B
TΦ 07 C
TΦ 07 D
TΦ 07 E

TΦ 08

VW 01 A
VW 01 B
VW 01 C
VW 01 D

VW 02 C
VW 02 D
VW 02 E

VW 03 A
VW 03 B
VW 03 C
VW 03 D

VW 04 A
VW 04 B

VW 05

VW 06 A
VW 06 B

VW 07

SEARCH CATEGORY II

NOZZLE C, VERTICAL LATCH, FIT CODES 1,2, OR 3

P 01 A
P 01 B
P 01 C
P 02 A
P 02 B
P 02 C
P 02 D
P 02 F
P 02 G
P 02 H
P 02 I
P 02 J
P 02 K
P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 J
P 04 A
P 04 C
P 04 D
P 05 A
P 06 C
D 01 A
D 01 B
D 01 C
D 01 D
D 02 A
D 02 B
D 03 A
D 03 B
D 03 C
D 03 D
D 03 E
D 03 F
D 03 G
D 03 H
D 03 I
D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G
D 05 B
D 06
CH 01
CH 02 A
CH 02 B
CH 02 D
CH 02 E
CH 02 F
CH 03 A
CH 03 B
CH 03 C
CH 04 A
CH 04 B
I 01 A
I 01 B
I 01 C
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 F
F 03 G
F 04 B
F 05
F 07 A
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G
F 09 A
F 09 B
F 09 C
F 09 D
F 09 E
F 10 A
F 10 D
F 11 A
F 11 B
F 11 C
F 12 A
F 12 B
F 13
M 01 A
M 01 D
M 01 E
M 01 F
M 02 A
M 02 B
M 02 C
M 02 D
M 03 A
M 03 B
M 03 C
M 03 D
M 03 E
M 04 A
M 04 B
M 04 C
M 04 D
M 05
M 06
M 07 A
M 07 B
M 07 C
M 07 D
M 07 E
L 01 A
L 01 B
L 01 C
L 01 D
L 02 A
L 02 B
L 02 C
L 02 D
C 01
C 02 A
C 02 B
C 02 C
C 02 D
C 03 A
C 03 B
C 03 C
C 04 A

SEARCH CATEGORY II, (CONT'D)

C 04 B
C 04 D
C 04 E

C 05 A
C 05 B
C 05 C
C 05 D
C 05 E
C 06 F
C 05 G

C 06 A
C 06 B
C 06 D
C 06 F

C 07 C

C 08 E
C 08 G
C 08 I
C 08 J

C 09 D
C 09 E
C 09 F

C 10 A
C 10 B
C 10 C
C 10 D
C 10 E
C 10 F

C 12

C 13

C 15 A
C 15 B
C 15 C

Pϕ 01

Pϕ 02 A
Pϕ 02 B
Pϕ 02 D

Pϕ 03 A
Pϕ 03 B
Pϕ 03 C
Pϕ 03 D

Pϕ 04 A
Pϕ 04 B
Pϕ 04 C
Pϕ 04 D

Pϕ 05 A
Pϕ 05 B

Pϕ 06 A
Pϕ 06 B
Pϕ 06 C
Pϕ 06 D
Pϕ 06 E

Pϕ 07 A
Pϕ 07 B

Pϕ 08 A
Pϕ 08 B
Pϕ 08 E

Pϕ 09 B
Pϕ 09 C
Pϕ 09 D
Pϕ 09 E
Pϕ 09 F
Pϕ 09 H

Pϕ 10

Pϕ 11 A
Pϕ 11 B
Pϕ 11 D

ϕ 01

ϕ 02 A
ϕ 02 B
ϕ 02 C

ϕ 03 B
ϕ 03 C
ϕ 03 D

ϕ 03 E
ϕ 03 F

ϕ 04 B
ϕ 04 C
ϕ 04 D

ϕ 05 A
ϕ 05 B

ϕ 06 A
ϕ 06 B
ϕ 06 C

ϕ 07 A
ϕ 07 D
ϕ 07 E
ϕ 07 F

ϕ 08 A
ϕ 08 B
ϕ 08 C

B 01

B 02

B 03 A
B 03 B
B 03 C
B 03 E
B 03 F
B 03 G
B 03 H

B 04 A
B 04 B
B 04 C
B 04 D

B 05 A
B 05 B
B 05 C
B 05 D
B 05 E
B 05 F
B 05 G

B 06 A
B 06 B
B 06 C

B 07

B 08

B 09 A
B 09 B

B 10 A
B 10 B
B 10 C

CA 01 A
CA 01 B
CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J

CA 02 A
CA 02 C
CA 02 F

CA 03 A
CA 03 B
CA 03 C
CA 03 D

AM 01

AM 02 A
AM 02 B
AM 02 C

AM 03 A
AM 03 B

AM 04 A
AM 04 B
AM 04 C

SEARCH CATEGORY 11, (CONT'D)

AM 05 A
AM 05 B

AM 06

AM 07 A
AM 07 B

AM 08

AU 01 A
AU 01 B
AU 01 C

CP 01 A
CP 01 B

CL 01

DA 01 A
DA 01 C

DA 02 A
DA 02 B

DA 04 A

DA 05

EF 01

H 01

MB 01

ΦP 01 B
ΦP 01 C

ΦP 02

ΦP 04

PR 02 B

TΦ 01 A
TΦ 01 B
TΦ 01 C

TΦ 03 A
TΦ 03 B
TΦ 03 C

TΦ 03 D
TΦ 03 E

TΦ 04 B

TΦ 05

TΦ 07 A
TΦ 07 B
TΦ 07 D
TΦ 07 E

TΦ 08

VW 01 C

VW 02 C

VW 03 B
VW 03 C

VW 04 B

VW 05

VW 06 A
VW 06 B

VW 07

SEARCH CATEGORY 12

NOZZLE C, VERTICAL LATCH, FIT CODES 1, 2, OR 3
AND FILL PIPE ANGLE LESS THAN 30 DEGREES

P 01 A
P 01 B
P 01 C
P 02 B
P 02 C
P 02 D
P 02 F
P 02 K
P 03 C
P 03 D
P 03 E
P 03 H
P 04 C
P 05 A
D 01 A
D 01 B
D 01 C
D 01 D
D 02 B
D 03 F
D 03 G
D 04 E
D 04 G
CH 02 D
CH 02 F
CH 03 B
CH 03 C
CH 04 B
I 01 A
I 01 B
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 F
F 03 G
F 04 B
F 05
F 07 A
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 11 A
F 11 C
M 01 A
M 01 D
M 01 E
M 01 F
M 02 A
M 02 C
M 03 A
M 04 A
M 04 B
M 05
M 06
L 01 A
L 01 C
L 01 D
L 02 A
L 02 B
C 02 D
C 03 A
C 03 C
C 04 E
C 05 C
C 05 D
C 06 D
C 06 F
C 10 F
C 13
P¢ 01
P¢ 03 C
P¢ 04 B
P¢ 04 D
P¢ 05 A
P¢ 06 E
P¢ 07 A
P¢ 09 F
P¢ 09 H
P¢ 11 A
¢ 03 C
¢ 03 E
¢ 04 C
B 03 C
B 03 E
B 03 F
B 03 H
AM 02 A
AM 02 B
AM 03 A
AM 04 B
AM 04 C
AM 05 A
AM 05 B
AM 07 B
CP 01 A
DA 04 A
EF 01
MB 01
T¢ 03 B
VW 06 B

SEARCH CATEGORY 13

NOZZLE C, ANY LATCH POSITION, FIT CODES 1,2,2',3 OR 3'

P 01 A
P 01 B
P 01 C
P 02 A
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 G
P 02 H
P 02 I
P 02 J
P 02 K
P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 I
P 03 J
P 04 A
P 04 C
P 04 D
P 05 A
P 05 C
P 06 C
D 01 A
D 01 B
D 01 C
D 01 D
D 02 A
D 02 B
D 03 A
D 03 B
D 03 C
D 03 D
D 03 E
D 03 F
D 03 G
D 03 H
D 03 I
D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G
D 05 B
D 06
CH 01
CH 02 A
CH 02 B
CH 02 C
CH 02 D
CH 02 E
CH 02 F
CH 03 A
CH 03 B
CH 03 C
CH 03 D
CH 04 A
CH 04 B
I 01 A
I 01 B
I 01 C
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G
F 04 A
F 04 B
F 05
F 06
F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G
F 09 A
F 09 B
F 09 C
F 09 D
F 09 E
F 10 A
F 10 B
F 10 C
F 10 D
F 11 A
F 11 B
F 11 C
F 12 A
F 12 B
F 13
M 01 A
M 01 B
M 01 C
M 01 D
M 01 E
M 01 F
M 02 A
M 02 B
M 02 C
M 02 D
M 03 A
M 03 B
M 03 C
M 03 D
M 03 E
M 04 A
M 04 B
M 04 C
M 04 D
M 05
M 06
M 07 A
M 07 B
M 07 C
M 07 D
M 07 E
L 01 A
L 01 B
L 01 C
L 01 D
L 02 A
L 02 B
L 02 C
L 02 D
C 01

SEARCH CATEGORY 13, (CONT'D)

C 02 A
C 02 B
C 02 C
C 02 D
C 03 A
C 03 B
C 03 C
C 04 A
C 04 B
C 04 C
C 04 D
C 04 E
C 05 A
C 05 B
C 05 C
C 05 D
C 05 E
C 05 F
C 05 G
C 06 A
C 06 B
C 06 C
C 06 D
C 06 E
C 06 F
C 07 A
C 07 B
C 07 C
C 07 D
C 08 C
C 08 D
C 08 E
C 08 G
C 08 I
C 08 J
C 09 C
C 09 D
C 09 E
C 09 F

C 10 A
C 10 B
C 10 C
C 10 D
C 10 E
C 10 F
C 12
C 13
C 15 A
C 15 B
C 15 C
Pϕ 01
Pϕ 02 A
Pϕ 02 B
Pϕ 02 C
Pϕ 02 D
Pϕ 03 A
Pϕ 03 B
Pϕ 03 C
Pϕ 03 D
Pϕ 04 A
Pϕ 04 B
Pϕ 04 C
Pϕ 04 D
Pϕ 05 A
Pϕ 05 B
Pϕ 06 A
Pϕ 06 B
Pϕ 06 C
Pϕ 06 D
Pϕ 06 E
Pϕ 07 A
Pϕ 07 B
Pϕ 08 A
Pϕ 08 B
Pϕ 08 D
Pϕ 08 E

Pϕ 08 F
Pϕ 09 A
Pϕ 09 B
Pϕ 09 C
Pϕ 09 D
Pϕ 09 E
Pϕ 09 F
Pϕ 09 H
Pϕ 10
Pϕ 11 A
Pϕ 11 B
Pϕ 11 D
ϕ 01
ϕ 02 A
ϕ 02 B
ϕ 02 C
ϕ 03 A
ϕ 03 B
ϕ 03 C
ϕ 03 D
ϕ 03 E
ϕ 03 F
ϕ 04 B
ϕ 04 C
ϕ 04 D
ϕ 05 A
ϕ 05 B
ϕ 06 A
ϕ 06 B
ϕ 06 C
ϕ 07 A
ϕ 07 D
ϕ 07 E
ϕ 07 F
ϕ 08 A
ϕ 08 B
ϕ 08 C

B 01
B 02
B 03 A
B 03 B
B 03 C
B 03 D
B 03 E
B 03 F
B 03 G
B 03 H
B 04 A
B 04 B
B 04 C
B 04 D
B 05 A
B 05 B
B 05 C
B 05 D
B 05 E
B 05 F
B 05 G
B 06 A
B 06 B
B 06 C
B 06 D
B 06 E
B 06 F
B 06 G
B 06 H
B 06 I
B 07
B 08
B 09 A
B 09 B
B 10 A
B 10 B
B 10 C

SEARCH CATEGORY 13, (CONT'D)

CA 01 A
CA 01 B
CA 01 C
CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J

CA 02 A
CA 02 B
CA 02 C
CA 02 F

CA 03 A
CA 03 B
CA 03 C
CA 03 D

AM 01

AM 02 A
AM 02 B
AM 02 C

AM 03 A
AM 03 B

AM 04 A
AM 04 B
AM 04 C

AM 05 A
AM 05 B

AM 06

AM 07 A
AM 07 B

AM 08

ST 01

AU 01 A
AU 01 B

AU 01 C

CP 01 A
CP 01 B

CL 01

DA 01 A
DA 01 C

DA 02 A
DA 02 B

DA 04 A

DA 05

EF 01

H 01

MB 01

MB 02

ΦP 01 B
ΦP 01 C

ΦP 02

ΦP 04

PR 02 B

TΦ 01 A
TΦ 01 B
TΦ 01 C

TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E

TΦ 04 B

TΦ 05

TΦ 07 A
TΦ 07 B
TΦ 07 D

TΦ 07 E

TΦ 08

VW 01 C

VW 02 C

VW 03 B
VW 03 C

VW 04 B

VW 05

VW 06 A
VW 06 B

VW 07

SEARCH CATEGORY 14

NOZZLE C, ANY LATCH POSITION, FIT CODES 1, 2, 2', 3 OR 3'
AND FILL PIPE ANGLE LESS THAN 30 DEGREES

P 01 A
P 01 B
P 01 C
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 K
P 03 C
P 03 D
P 03 E
P 03 H
P 03 I
P 04 C
P 05 A
D 01 A
D 01 B
D 01 C
D 01 D
D 02 B
D 03 F
D 03 G
D 04 E
D 04 G
CH 02 D
CH 02 F
CH 03 B
CH 03 C
CH 03 D
CH 04 B
I 01 A
I 01 B
F 01 A
F 01 B

F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G
F 04 A
F 04 B
F 05
F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 11 A
F 11 C
M 01 A
M 01 B
M 01 D
M 01 E
M 01 F
M 02 A
M 02 C
M 03 A
M 04 A
M 04 B
M 05

M 06
L 01 A
L 01 C
L 01 D
L 02 A
L 02 B
C 02 D
C 03 A
C 03 C
C 04 E
C 05 C
C 05 D
C 06 C
C 06 D
C 06 E
C 06 F
C 09 F
C 10 F
C 13
PΦ 01
PΦ 03 C
PΦ 04 B
PΦ 04 D
PΦ 05 A
PΦ 06 E
PΦ 07 A
PΦ 08 D
PΦ 09 F
PΦ 09 H
PΦ 11 A
Φ 03 C
Φ 03 E

Φ 04 C
B 03 C
B 03 D
B 03 E
B 03 F
B 03 H
B 06 D
B 06 E
B 06 F
B 06 H
B 06 I
AM 02 A
AM 02 B
AM 03 A
AM 04 B
AM 04 C
AM 05 A
AM 05 B
AM 07 B
ST 01
CP 01 A
DA 04 A
EF 01
MB 01
TΦ 03 B
VW 06 B

SEARCH CATEGORY 15

NOZZLE C, ANY LATCH POSITION OR HAND-HOLD

FIT CODES 1, 2, 2', 3, 3', 4, 4', 5, OR 5'

P 01 A
P 01 B
P 01 C
P 02 A
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 G
P 02 H
P 02 I
P 02 J
P 02 K
P 03 A
P 03 B
P 03 C
P 03 D
P 03 E
P 03 F
P 03 G
P 03 H
P 03 I
P 03 J
P 04 A
P 04 C
P 04 D
P 05 A
P 05 B
P 05 C
P 06 A
P 06 B
P 06 C
D 01 A
D 01 B
D 01 C
D 01 D
D 02 A
D 02 B
D 03 A
D 03 B
D 03 C
D 03 D
D 03 E
D 03 F
D 03 G
D 03 H
D 03 I
D 04 A
D 04 B
D 04 C
D 04 D
D 04 E
D 04 F
D 04 G
D 05 A
D 05 B
D 06
CH 01
CH 02 A
CH 02 B
CH 02 C
CH 02 D
CH 02 E
CH 02 F
CH 03 A
CH 03 B
CH 03 C
CH 03 D
CH 04 A
CH 04 B
I 01 A
I 01 B
I 01 C
F 01 A
F 01 B
F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G
F 04 A
F 04 B
F 05
F 06
F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 08 E
F 08 F
F 08 G
F 09 A
F 09 B
F 09 C
F 09 D
F 09 E
F 10 A
F 10 B
F 10 C
F 10 D
F 11 A
F 11 B
F 11 C
F 12 A
F 12 B
F 13
M 01 A
M 01 B
M 01 C
M 01 D
M 01 E
M 01 F
M 02 A
M 02 B
M 02 C
M 02 D
M 03 A
M 03 B
M 03 C
M 03 D
M 03 E
M 04 A
M 04 B
M 04 C
M 04 D
M 05
M 06
M 07 A
M 07 B
M 07 C
M 07 D
M 07 E
L 01 A
L 01 B
L 01 C
L 01 D
L 02 A
L 02 B

SEARCH CATEGORY 15, (CONT'D)

L 02 C
L 02 D

C 01

C 02 A
C 02 B
C 02 C
C 02 D

C 03 A
C 03 B
C 03 C

C 04 A
C 04 B
C 04 C
C 04 D
C 04 E

C 05 A
C 05 B
C 05 C
C 05 D
C 05 E
C 05 F
C 05 G

C 06 A
C 06 B
C 06 C
C 06 D
C 06 E
C 06 F

C 07 A
C 07 B
C 07 C
C 07 D

C 08 B
C 08 C
C 08 D
C 08 E
C 08 G
C 08 I
C 08 J

C 09 B
C 09 C
C 09 D
C 09 E
C 09 F

C 10 A
C 10 B
C 10 C
C 10 D
C 10 E
C 10 F

C 11 A
C 11 B

C 12

C 13

C 15 A
C 15 B
C 15 C

Pϕ 01

Pϕ 02 A
Pϕ 02 B
Pϕ 02 C
Pϕ 02 D

Pϕ 03 A
Pϕ 03 B
Pϕ 03 C
Pϕ 03 D

Pϕ 04 A
Pϕ 04 B
Pϕ 04 C
Pϕ 04 D

Pϕ 05 A
Pϕ 05 B
Pϕ 06 A
Pϕ 06 B
Pϕ 06 C
Pϕ 06 D
Pϕ 06 E

Pϕ 07 A
Pϕ 07 B

Pϕ 08 A
Pϕ 08 B
Pϕ 08 D
Pϕ 08 E
Pϕ 08 F
Pϕ 08 G

Pϕ 09 A
Pϕ 09 B
Pϕ 09 C
Pϕ 09 D
Pϕ 09 E
Pϕ 09 F
Pϕ 09 H

Pϕ 10

Pϕ 11 A
Pϕ 11 B
Pϕ 11 D

ϕ 01

ϕ 02 A
ϕ 02 B
ϕ 02 C

ϕ 03 A
ϕ 03 B
ϕ 03 C
ϕ 03 D
ϕ 03 E
ϕ 03 F

ϕ 04 A
ϕ 04 B
ϕ 04 C
ϕ 04 D

ϕ 05 A
ϕ 05 B

ϕ 06 A
ϕ 06 B
ϕ 06 C

ϕ 07 A
ϕ 07 B
ϕ 07 E
ϕ 07 F

ϕ 08 A
ϕ 08 B
ϕ 08 C

B 01

B 02

B 03 A
B 03 B
B 03 C
B 03 D
B 03 E
B 03 F
B 03 G
B 03 H

B 04 A
B 04 B
B 04 C
B 04 D

B 05 A
B 05 B
B 05 C
B 05 D
B 05 E
B 05 F
B 05 G

B 06 A
B 06 B

SEARCH CATEGORY 15, (CONT'D)

B 06 C
B 06 D
B 06 E
B 06 F
B 06 G
B 06 H
B 06 I
B 07
B 06
B 09 A
B 09 B
B 10 A
B 10 B
B 10 C
CA 01 A
CA 01 B
CA 01 C
CA 01 D
CA 01 E
CA 01 F
CA 01 G
CA 01 H
CA 01 I
CA 01 J
CA 02 A
CA 02 B
CA 02 C
CA 02 F
CA 03 A
CA 03 B
CA 03 C
CA 03 D
AM 01
AM 02 A
AM 02 B
AM 02 C
AM 03 A
AM 03 B
AM 04 A
AM 04 B
AM 04 C
AM 05 A
AM 05 B
AM 06
AM 07 A
AM 07 B
AM 08
ST 01
AU 01 A
AU 01 B
AU 01 C
CP 01 A
CP 01 B
CL 01
DA 01 A
DA 01 C
DA 02 A
DA 02 B
DA 04 A
DA 05
FI 01
EF 01
H 01
MB 01
MB 02
ΦP 01 B
ΦP 01 C
ΦP 02
ΦP 04
PR 01
PR 02 A
PR 02 B
PR 02 C
TΦ 01 A
TΦ 01 B
TΦ 01 C
TΦ 02 C
TΦ 03 A
TΦ 03 B
TΦ 03 C
TΦ 03 D
TΦ 03 E
TΦ 04 B
TΦ 05
TΦ 07 A
TΦ 07 B
TΦ 07 D
TΦ 07 E
TΦ 08
VW 01 A
VW 01 B
VW 01 C
VW 01 D
VW 02 C
VW 02 D
VW 02 E
VW 03 A
VW 03 B
VW 03 C
VW 03 D
VW 04 A
VW 04 B
VW 05
VW 06 A
VW 06 B
VW 07

SEARCH CATEGORY 16

NOZZLE A, MAJOR ACCESS, FIT CODE 24

C	05	E
C	06	C
C	08	F
C	09	C
PΦ	06	C
PΦ	06	E
PΦ	08	C
PΦ	09	G
Φ	03	A
Φ	04	A
B	05	D
B	06	H
CA	01	K
CA	01	L
CA	02	D
CA	03	D
CA	03	E
DA	01	D
PR	02	A
TΦ	02	C
TΦ	06	A
VW	06	B

SEARCH CATEGORY 17

NOZZLE A, MINOR ACCESS, FIT CODE 23

D	03	D
C	08	A
C	09	A
C	09	B
PΦ	03	A
PΦ	08	F

SEARCH CATEGORY 18

NOZZLE A, SHARP BEND, FIT CODE 22

P	04	A
P	04	B
D	01	D
F	13	
C	02	A
C	02	B
C	03	A
C	14	
Pϕ	01	
B	01	
AM	04	B
AM	07	A
A''	01	C
DA	04	B
DA	04	C
MA	01	
ϕP	01	A
ϕP	01	B
ϕP	01	C
Tϕ	02	A
Tϕ	02	B
Tϕ	04	A
Tϕ	04	B
Tϕ	06	B
VW	02	A
VW	02	B

SEARCH CATEGORY 19

NOZZLE A, PIPE TOO LARGE, FIT CODES 6, 9, 12, 15, OR 18

C 04 B
DA 03

SEARCH CATEGORY 20

NOZZLE A, PIPE TOO SMALL, FIT CODE 21

P 06 C
HO 01
PR 02 B

SEARCH CATEGORY 21

NOZZLE A, FILL-CAP RETAINER MECHANISM PREVENTS SEAL, FIT CODES 7', 10', 13', 16', OR 19'

P 04 C
F 03 E

SEARCH CATEGORY 22

NOZZLE A, INTEFERENCE WITH SEAL IN IMMEDIATE VICINITY OF PIPE OPENING, FIT CODES 7, 10, 13, 16, OR 19

P	05	A
P	05	B
I	01	C
P¢	09	H
¢	07	B
¢	07	C
AM	05	B
T¢	07	C
VW	03	B

SEARCH CATEGORY 23

NOZZLE A, SEAL DOES NOT TOUCH PIPE IN ONE REGION FIT CODES 8, 11, 14, 17, OR 20

NONE

SEARCH CATEGORY 24

NOZZLE A, LEAD RESTRICTOR PREVENTS OR INTERFERES WITH SEAL, ANY FIT CODE WITH ASTERISK

P¢	03	A
B	01	
¢P	01	A
T¢	02	A
T¢	04	A
VW	02	A

SEARCH CATEGORY 25

NOZZLE C, MAJOR ACCESS , FIT CODE 24

C 08 F
C 08 H
PØ 08 C

CA 01 K
CA 02 D
CA 03 E

DA 01 B
DA 01 D
TØ 06 A

SEARCH CATEGORY 26

NOZZLE C, MINOR ACCESS, FIT CODE 23

C 08 A
C 09 A
C 14

SEARCH CATEGORY 27

NOZZLE C, SHARP BEND, FIT CODE 22

P 04 B
DA 04 C
MA 01

ØP 01 A
TØ 02 A
TØ 02 B

TØ 04 A
TØ 06 B
VW 02 A

VW 02 B

SEARCH CATEGORY 28

NOZZLE C, PIPE TOO LARGE, FIT CODES 6, 9, 12, 15 OR 18

C 11 C

DA 03

SEARCH CATEGORY 29

NOZZLE C, PIPE TOO SMALL, FIT CODE 21

NONE

SEARCH CATEGORY 30

NOZZLE C, FILL-CAP RETAINER MECHANISM PEVENTS SEAL, FIT CODES 7', 10', 13', 16', OR 19'

NONE

SEARCH CATEGORY 31

NOZZLE C, INTERFERENCE WITH SEAL IN IMMEDIATE VICINITY OF PIPE OPENING, FIT CODES 7, 10, 13, 16 OR 19

PØ	11	C	CA	01	L
Ø	07	B	CA	02	E
Ø	07	C	TØ	07	C

SEARCH CATEGORY 32

NOZZLE C, SEAL DOES NOT TOUCH PIPE IN ONE REGION, FIT CODES 8, 11, 14, 17, OR 20

PØ	09	G
DA	04	B
ØP	03	

SEARCH CATEGORY 33

NOZZLE C, LEAD RESTRICTOR PREVENTS OR INTEFERES WITH SEAL, ANY FIT CODE WITH ASTERISK

DA	01	B	TØ	04	A
ØP	01	A	VW	02	A
TØ	02	A			

SEARCH CATEGORY 34

NOZZLE A, NON-LATCHING, FIT CODES 4,5,18,19,20,21,22,23 OR 24

P 02 E
P 02 F
P 02 H
P 02 I
P 04 A
P 04 B
P 05 B
P 06 A
P 06 B
P 06 C
D 01 D
D 03 C
D 03 D
D 03 E
D 03 G
D 05 A
D 05 B
D 06
CH 02 F
CH 03 A
CH 04 B
F 09 D
F 10 B
F 10 C
F 10 D
F 13
M 01 B
M 01 E
M 01 F
M 07 C
L 01 C
C 02 A
C 02 B
C 03 A
C 03 B
C 04 A
C 05 E
C 05 F
C 06 C
C 07 A
C 07 B
C 08 A
C 08 C
C 08 D
C 08 F
C 08 H
C 09 A
C 09 B
C 09 C
C 09 E
C 10 A
C 10 D
C 11 A
C 11 B
C 11 C
C 14
PΦ 01
PΦ 03 A
PΦ 04 D
PΦ 06 C
PΦ 06 E
PΦ 08 C
PΦ 08 F
PΦ 09 G
Φ 03 A
Φ 03 B
Φ 04 A
Φ 06 A
Φ 06 B
Φ 07 A
Φ 07 F
B 01
B 03 D
B 04 A
B 05 B
B 05 C
B 05 D
B 06 E
B 06 H
B 10 A
CA 01 A
CA 01 B
CA 01 F
CA 01 J
CA 01 K
CA 01 L
CA 02 B
CA 02 D
CA 02 E
CA 03 D
CA 03 E
AM 04 B
AM 07 A
AU 01 C
CP 01 A
DA 01 D
DA 03
DA 04 B
DA 04 C
FI 01
H 01
MA 01
ΦP 01 A
ΦP 01 B
ΦP 01 C
ΦP 02
ΦF 03
ΦP 04
PR 01
PR 02 A
PR 02 B
PR 02 C
TΦ 02 A
TΦ 02 B
TΦ 02 C
TΦ Φ4 A
TΦ Φ4 B
TΦ 06 A
TΦ 06 B
TΦ 07 E
VW 01 A
VW 01 B
VW 01 D
VW 02 A
VW 02 B
VW 02 D
VW 02 E
VW 03 A
VW 03 C
VW 03 D
VW 04 A
VW 06 B

SEARCH CATEGORY 35

NOZZLE C, NON-LATCHING, FIT CODES 4, 5, 18, 19, 20, 21, 22, 23 OR 24

P	04	B
P	05	B
P	06	A
P	C6	B
D	05	A
C	08	A
C	08	B
C	C8	F
C	08	H
C	09	A
C	09	B
C	11	A
C	11	B
C	11	C
C	14	
PØ	08	C
P	04	A
CA	01	A
CA	02	D
CA	03	E
DA	01	B
DA	01	D
DA	C3	
DA	04	C
FI	01	
MA	01	
PD	01	A
PR	01	
PR	02	A
PR	02	C
TØ	02	A
TØ	02	B
TØ	02	C
TØ	04	A
TØ	06	A
TØ	06	B
VW	01	A
VW	01	B
VW	01	D
VW	02	A
VW	02	B
VW	02	D
VW	02	E
VW	03	A
VW	03	D
VW	04	A

SEARCH CATEGORY 36

TOTAL NON-SEAL FOR NOZZLES A, B, AND C

FIT CODES FOR ALL NOZZLES IN RANGE 6 THROUGH 24

P 04 B
C 08 F
C 11 C
P∅ 08 C
P∅ 09 G

∅ 07 B
∅ 07 C
CA 01 K
CA 01 L
CA 02 D
CA 03 E

DA 01 D
DA 03
DA 04 B
DA 04 C
MA 01
∅P 01 A

T∅ 02 A
T∅ 02 B
T∅ 04 A
T∅ 06 A
T∅ 06 B
VW 02 A
VW 02 B

SEARCH CATEGORY 37

LATCH NOT POSSIBLE, FILL PIPES WITH NO INNER LIP

C 11 B
C 11 C
FI 01
PR 01

PR 02 A
PR 02 B
PR 02 C
VW 01 B
VW 01 D

VW 02 D
VW 02 E
VW 03 D
VW 04 A

SEARCH CATEGORY 38

FILL PIPE ANGLE LESS THAN 30 DEGREES

P 01 A
P 01 B
P 01 C
P 02 B
P 02 C
P 02 D
P 02 E
P 02 F
P 02 K
P 03 C
P 03 D
P 03 E
P 03 H
P 03 I
P 04 C
P 05 A
D 01 A
D 01 B
D 01 C
D 01 D
D 02 B
D 03 F
D 03 G
D 04 E
D 04 G
CH 02 D
CH 02 F
CH 03 B
CH 03 C
CH 03 D
I 01 A
I 01 B
I 01 A
I 01 B

F 02 A
F 02 B
F 03 A
F 03 B
F 03 C
F 03 D
F 03 E
F 03 F
F 03 G
F 04 A
F 04 B
F 05
F 07 A
F 07 B
F 07 C
F 07 D
F 07 E
F 07 F
F 07 G
F 07 H
F 08 A
F 08 B
F 08 C
F 08 D
F 11 A
F 11 C
M 01 A
M 01 B
M 01 D
M 01 E
M 01 F
M 02 A
M 02 C
M 03 A
M 04 A
M 04 B

M 05
M 06
L 01 A
L 01 C
L 01 D
L 02 A
L 02 B
C 02 D
C 03 A
C 03 C
C 04 E
C 05 C
C 05 D
C 06 C
C 06 D
C 06 E
C 06 F
C 09 C
C 10 F
C 13
C 14
PΦ 01
PΦ 03 C
PΦ 04 B
PΦ 04 D
PΦ 05 A
PΦ 06 E
PΦ 07 A
PΦ 08 C
PΦ 08 D
PΦ 08 G

PΦ 09 F
PΦ 09 H
PΦ 11 A
Φ 03 C
Φ 03 E
Φ 04 C
B 03 C
B 03 D
B 03 E
B 03 F
B 03 H
B 06 D
B 06 E
B 06 F
B 06 H
B 06 I
AM 02 A
AM 02 B
AM 03 A
AM 04 B
AM 04 C
AM 05 A
AM 05 B
AM 07 B
ST 01
CP 01 A
DA 04 A
EF 01
MB 01
VW 02 A
VW 02 B
VW 06 B

SEARCH CATEGORY 39

FILL-CAP NOT VENTED AND PRE-1970

P 01 C
P 02 J
P 02 K
P 03 H
P 03 I
P 03 J
P 04 C
P 04 D
D 01 C
D 01 D
D 03 G
D 04 F
D 04 G
CH 02 E
CH 02 F
CH 03 C
CH 03 D
I 01 C
F 07 F
F 07 G
F 10 C
F 10 D
C 05 D
C 05 E
C 05 F
C 05 G
C 07 C
C 08 F
C 08 G
C 08 H
C 08 I
C 09 F
C 12

Pϕ 04 B
Pϕ 04 C
Pϕ 04 D
Pϕ 05 B
Pϕ 06 B
Pϕ 06 C
Pϕ 06 D
Pϕ 06 E
Pϕ 08 G
Pϕ 10
ϕ 03 E
ϕ 03 F
ϕ 04 D
ϕ 05 A
ϕ 05 B
ϕ 06 C
ϕ 07 C
ϕ 07 D
ϕ 07 E
ϕ 07 F
B 03 E
B 03 F
B 03 G
B 03 H
B 04 D
B 05 F
B 05 G
B 06 E
B 06 F
B 06 G
B 06 H
B 08
CA 01 G
CA 01 H

CA 01 I
CA 01 J
CA 03 B
CA 03 C
CA 03 D
AM 05 B